AMERICAN INTERNATIONAL UNIVERSITY, BANGLADESH

01389-Object Oriented Analysis and Design

Final Term Group Project

Group Name: Group-7

Project Name: Emergency Health Service(EHS)

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Abstract

Emergency Health Service is a dream to make health sector simpler and digitalized to ensure the fastest service free from corruption as much as possible during any pandemic situation.

This report indicates the background information, objectives, scope, requirements and the components of the Emergency Health Service. In the other words, this report is going to point out the functions required to fulfill the need of Emergency Health Service.

Background Information

We are living in a world driven by technology. The advancement of technology has played an important role in the development of human civilization. Technology provides innovative ways of doing work through various smart means. But we have to waste a lot of time when an emergency come related to heath. In this pandemic situation, it is much harder to manage ICU, CCU or Ventilation and Oxygen facility. Also, there are corruptions in every step and sometimes it is not affordable for the common people. It is also risky for others if a covid patient get in touch. So, it is time to think about a solution to address this situations. We are trying to fix this problem with the help of a device that are commonly used nowadays at anywhere and that is the smart phone.

Objective

- Knowing about the vacancies in ICU, Ventilation and dedicated Covid units with online booking facility
- Emergency transport (ambulance) service
- Scan the QR code and take the service directly without wasting time in the reception
- For Hospital Authorities (Doctors and Administrations) safety, they can use Patient Portal created with the concept of cloud computing.
- Also, Authority can monitor ventilation level by the help of inbuilt censor.

Scope

Our project is targeted to reduce the annoyance of patient owing a smart phone with GPS capabilities.(primarily it is just lunch for Android platform).

Features & functionalities of our project include

- Easy one step setup: The user has to download our app from Google Play Store. Then, sign-up with by entering phone number, username and a password. After login user can update the profile with proper details and medical information.

- Ease of usage: In any emergency case, user can know the vacancies in ICU, Ventilation and dedicated Covid units etc. User can directly book a service with online payment methods. Emergency transport service is also available with driver's name, phone number and current location in map. After reaching the hospital, just scan the code in the scanner and desired service will be immediately provided without wasting any time.

- Security: We want to implement SSL protocol in our website to encrypt information that goes through the site, such as credit card details and sensitive data that customers share during the booking process [1]. Also, we have a prime concern to add Tokenization, a technology that makes it easier to improve payment security and provide a payment payment-gateway service without vulnerabilities. It helps to authenticate the customer during the purchase without affecting the security of a transaction [1]. We want to use Django as out server-side language because of it's too excellent to handle thousands of requests and high-traffic apps with best security systems.

Proposed Solation and Technical Components

Wed and mobile app interface

We are planning to design a web interface and mobile interface for our proposed project. In this pandemic situation, our proposed app may help Doctors and patients maintaining social distancing. For emergency survives needed at Covid-19, our app can play a vital role. Family members of a patient or a user can check for

ICU, Ventilation and Covid unit and book in of these by doing payments by card or any mobile banking services like Bkash or Nagad.

Hospital Information Update

The dedicated management authorities of the hospital can update their vacancy of various Covid-19 units.

Database

There will be a central database for strong information. The information includes the sign up (Username, Password, Name, Email/Phone Number), Login (Username, Password), Update Profile (First name, Last name, Phone Number, Date of Birth, NID/Birth certificate, Present Address), Covid Corner(ICU, Ventilator, Covid Unit), Details (Hospital Name, Location), Booking (Unit name, Word No, Price), Scan QR Code(Booked Service Alert Message, Patient Information, Admit Location), Transport Facility (General Ambulance, ICU Ambulance), Report(Update, Add new). Patient Portal(Patient Name, ID, Health Report, Test Report), Ventilation(Patient ID, Ventilation Reading), Oxygen(Current Usages, Total Stock).

Technical Feasibility

Technically our proposed Emergency Health Service is completely possible. Since, everyone uses smartphones that's why they can take this service at any time. It is possible to get Emergency Health Service from any place through smartphone. In this pandemic situation, just open the app and watch hospitals with available services. One can directly book emergency for heath security reason and after reaching to the hospital, just scan the QR code to get your desired service without wasting time in reception.

Organizational Feasibility

Since maximum people use smartphones nowadays, we are confident that they will use our Emergency Health Service for their needs. Probably, software users will

not be able to access the software directly. The user needs to login access the software.

Other difficulties and constrains

Lack of support for iPhones:

We call know that the app develops in Flutter can just run on IOS. In some case, apps built in React Native also supports on IOS. Right now, we want to develop our mobile app in JAVA and that's why the it will not be applicable for any IOS device for now. So, IOS users have to use until we develop this app in Flutter or in React Native.

Compatibility:

In the NFC/RFID front a war is going on between Broadcom and NXP, these are the companies which manufacture NFC chips and readers. NXP is not willing to license their technology to Broadcom so the phones such as Nexus 4, Galaxy S4 are experiences compatibility issues with the MIRFARE NFC tags/readers (manufactured by NXP). But still we can overcome it as even these Broadcom NFC chips can read the Unique ID (UID) of the Mirfare's tags so we can use this UID as the key in our projects. And after the establishment of NFC forum (the forum to standardize NFC technology) thing are being standardized so we can expect a better future than now [2].

Risk

Since, the software we have created can be used by users on their smart phones by megabytes. Software users may not always have megabytes on their smartphones. On the other hand, we need to keep in mind that less megabytes are needed to use the software.

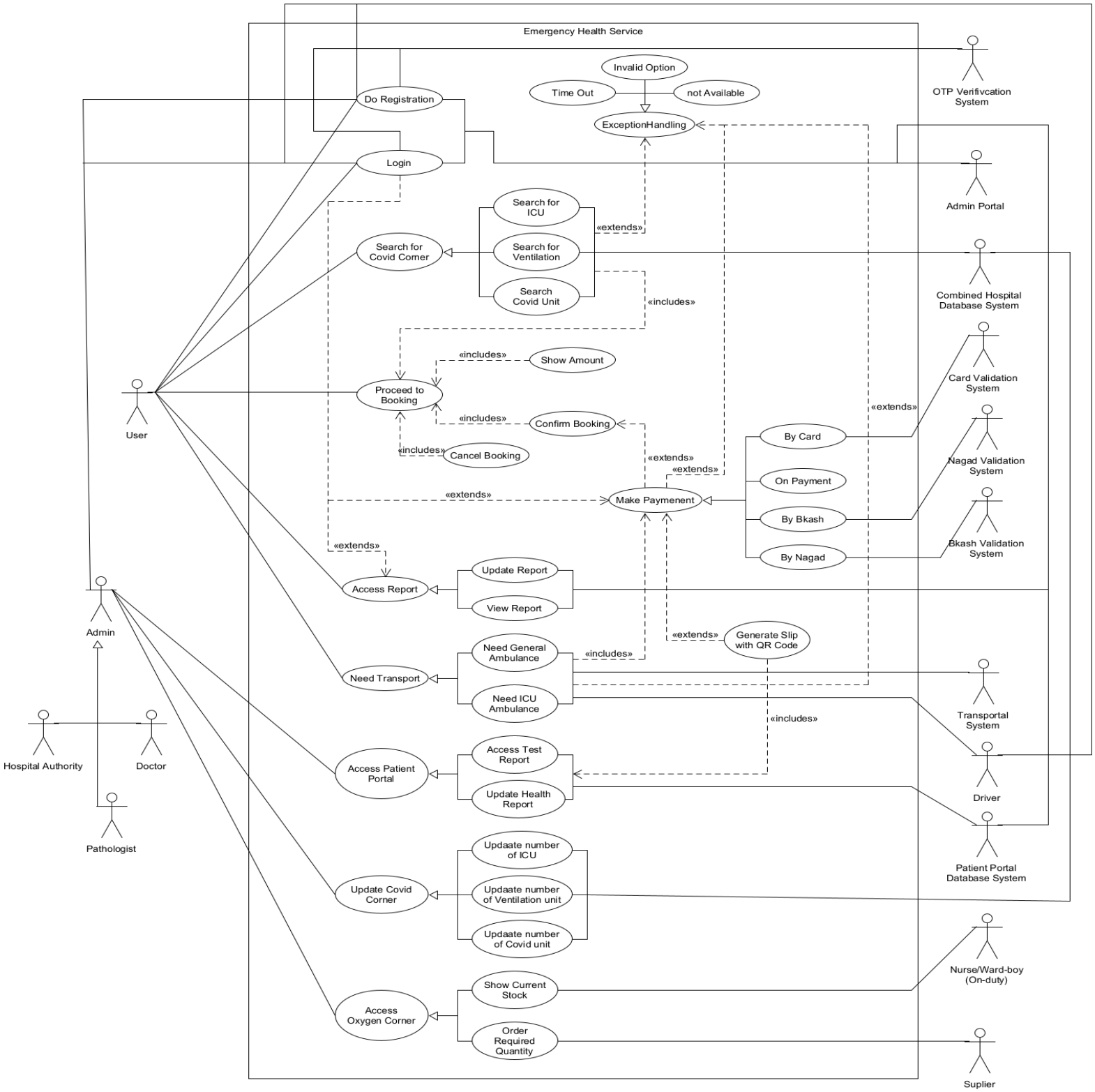
Some users still might not have smartphones. So, they will be deprived of the benefits of these apps. The beauty of the idea is that, it can be used on any smartphones, in the form of apps like any other conventional software. Last but not least, software user should have minimum knowledge of Bengali and English language.

Alternatives

Possible alternatives might include physical work done. But this may be dangerous for himself and others because people may be infected by coming in touch of a Covid-19 patient and also this would be very time-consuming which may be very dangerous for patients too. Sometimes due to the lack Oxygen and Ventilation facility with proper treatment, Covid-19 patient face immature death. Booking service and ICU, CCU available sets of different Hospital may include in different hospital websites which is also time consuming. Also, corruption is seen is the current health sector that makes these services unaffordable for the middle- and lower-class people. That's why we are thinking make things simpler as today's world is enriched with technologies and this may help making the health sector digitalized.

Use Case Diagram

[


Emergency Health Service
Invalid Option
Time Out
not Available
ExceptionHandling
Do Registration
Login
OTP Verifivcation System
Admin Portal
Search for ICU
Search for Covid Corner
Search for Ventilation
Search Covid Unit
«extends»
«includes»
Combined Hospital Database System
Show Amount
Proceed to Booking
Confirm Booking
Cancel Booking
User
Card Validation System
Nagad Validation System
Bkash Validation System
By Card
On Payment
By Bkash
By Nagad
Make Paymenent
Update Report
View Report
Access Report
Admin
Generate Slip with QR Code
Need General Ambulance
Need Transport
Need ICU Ambulance
Transportal System
Hospital Authority
Doctor
Access Test Report
Update Health Report
Access Patient Portal
Driver
Pathologist
Patient Portal Database System
Updaate number of ICU
Updaate number of Ventilation unit
Updaate number of Covid unit
Update Covid Corner
Nurse/Ward-boy (On-duty)
Show Current Stock
Order Required Quantity
Access Oxygen Corner
Suplier

Use Case Specification
Registration:

Table 1: Registration

Use Case Name:	Register Account	
Actor(s):	User, Admin, Admin Portal, Patient Portal, OTP verification System	
Description:	This use case describes the process of a user become the member.	
Reference ID:	EHS-001	
Typical course of events:	**Actor Action** **Step 1:** Click on Register. **Step 3:** User will choose "As a patient" **Step 4:** User will Enter name, phone number, password and present address. **Step 7:** Enter OTP code.	**System Response** **Step 2:** System will display resister (i) as a patient or (ii) as an Admin. **Step 5:** Patient portal will check the member record if this exist or not. **Step 6:** System will send an OTP for confirmation. **Step 8:** If the OTP matched, system will record the information and display "Registration Successful".
Alternative course of events:	**Step 3a:** User will choose "As an Admin" **Step 4a:** User will enter institutional ID, name, phone number and password.	

		Step 5a: Admin portal will check the member record if this exist or not. **Step 6a:** If the account already exist, system will return “Already have an account” and redirect to sign up page. **Step 8a:** If the OTP does not match, system will display “OTP does not match” and redirect to register page.
Precondition:	User should not have an account linked with the provided phone number previously .	
Postcondition:	User must remember the password.	System must record the provided information.

Login:

Table 2: Login

Use Case Name:	Login	
Actor(s):	User, Admin, OTP verification system	
Description:	This use case describes the process of a user's signup.	
Reference ID:	EHS-002	
Typical course of events:	**Actor Action** **Step 1:** Click on Login. **Step 3:** User will choose to sign up as a patient **Step 4:** User will enter phone number and password	**System Response** **Step 2:** System will display sign up (i) as a patient or (ii) as an Admin. **Step 5:** If the information is correct, system will display "Sign-up Successful".
Alternative course of events:	**Step 3a:** User will choose to sign up as an Admin. **Step 4a:** User will enter institutional ID and password	**Step 5a:** Information is correct, system will send an OTP as sign up for Admin is protected with Two-Step verification procedure **Step 5b:** If the account does not exist, system will suggest for "create

	Step 6: User will enter the OTP	account" or ask them "Forget Password ?". **Step 7:** System will check the OTP. If correct, it will display sign up successful.
Precondition:	User should have registered an account previously .	
Postcondition:		System must remember the user.

Covid corner:

Table 3: Search for Covid Corner

Use Case Name:	Search for Covid corner.	
Actor(s):	User, Combined Database system.	
Description:	This use case describes our services dedicated to covid patients	
Reference ID:	EHS-003	
Typical course of events:	**Actor Action** **Step 1:** Click on "Search for Covid Corner". **Step 3:** User choose "Search for ICU". **Step 5:** The user will choose the seat he requires from the available options.	**System Response** **Step 2:** System will display 3 options: (i) Search for ICU (ii) Search for Ventilator (iii) Search Covid Unit **Step 4:** System will show number of seats available at ICU from combined hospital database. **Step 6:** System will remember the choice made by the user.
Alternative course of events:	**Step 3a:** User choose "Search for Ventilation". **Step 3b:** User choose "Search Covid Unit".	**Step *4(i):** If user take too long time, system will display "Time out" **Step *4(ii):** If user inputs wrong option, system will display "Invalid option"

		Step *4(iii): If there is no desired seat available, system will display “not Available” **Step 4a:** System will show number of seats available at Ventilation unit from combined hospital database. **Step 4b:** System will show number of seats available at dedicated Covid unit from combined hospital database.
Precondition:	Not applicable N/A	
Postcondition:		System must remember the choices made by the user.

Proceed to Booking:

Table 4: Proceed to Booking

Use Case Name:	Proceed to Booking	
Actor(s):	User, System	
Description:	This use case describes the procedures of a user to book a service.	
Reference ID:	EHS-004	
Typical course of events:	**Actor Action** **Step 1:** Click on "Proceed to Booking". **Step 3:** User choose "Show Amount". **Step 5:** User choose "Confirm Booking".	**System Response** **Step 2:** System displays (i) Show Amount (ii) Confirm Booking and (iii) Cancel Booking **Step 4:** The system calculates the total amount and display it. **Step 6:** System will take user to "Make Payment"
Alternative course of events:	**Step 5a:** User choose "Cancel Booking".	**Step 6a:** System will erase total calculated bill and selected seat by the user.
Precondition:	User must select at least one in any unit.	
Postcondition:		System must remember the total booking bill.

Make Payment:

Table 5: Make Payment

Use Case Name:	Make Payment	
Actor(s):	User	
Description:	This use case describes the process to make payment so that a user can finalize the booking	
Reference ID:	EHS-005	
Typical course of events:	**Actor Action** **Step 1:** Click on "Make Payment". **Step 3:** User choose "By Card". **Step 5:** User will provide necessary information.	**System Response** **Step 2:** System displays (i) By Card (ii) On Payment (iii) By Nagad and (iv) By Bkash **Step 4:** System will ask for the card information. **Step 6:** Card validation system will check the validation of the card. If all OK, system will deduct the amount calculated and generate a payment slip with QR code
Alternative course of events:	**Step 3a:** User choose "On Payment" **Step 3b:** User choose "By Nagad" **Step 3c:** User choose "By Bkash"	**Step 4b:** System will ask for the Nagad account information.

		Step 4c: System will ask for the Bkash account information. **Step *5a:** If user take too long time, system will display “Time out” **Step *5b:** If user inputs wrong option, system will display “Invalid option” **Step *5c:** If there is too much buffer, system will display “not Available” **Step 6b:** Nagad validation system will check the validation of the account. If all OK, system will deduct the amount calculated and generate a payment slip with QR code **Step 6c:** Bkash validation system will check the validation of the account. If all OK, system will deduct the amount calculated and generate a payment slip with QR code
Precondition:	User must confirm the booking	
Postcondition:		System must remember the account by which payment has done. So that, for any systematic error, refund can be provided.

Access Report:

Table 6: Access Report

Use Case Name:	Access Report	
Actor(s):	User, Patient Portal Database System	
Description:	This use case describes the process of making the soft copy of the test reports which will be easier to access through our designed system.	
Reference ID:	EHS-006	
Typical course of events:	**Actor Action** **Step 1:** Click on "Report". **Step 3:** User choose "View Report". **Step 4:** User will enter the type of the test.	**System Response** **Step 2:** System displays (i) View Report and (ii) Update Report **Step 5:** System will Display the report
Alternative course of events:	**Step 3a:** User choose "Update Report" **Step 4a:** User will add report.	**Step 5a:** If the report is new in the list, system will add this. It there is same type report exist, system will overwrite the previous report.
Precondition:	User must come to Report section	
Postcondition:		System must remember the changes make by the user.

Need Transport:

Table 7: Need Transport

Use Case Name:	Need Transport	
Actor(s):	User, Transportal System, Driver	
Description:	This use case describes the process of a booking emergency ambulance service through our system.	
Reference ID:	EHS-007	
Typical course of events:	**Actor Action** **Step 1:** Click on "Need Transport". **Step 3:** User will choose "Need General Ambulance". **Step 5:** User will complete the "Make Payment" which is included with the Transport service.	**System Response** **Step 2:** System displays (i) Need General Ambulance and (ii) Need ICU Ambulance **Step 4:** Transportal System will check and if any available general ambulance found, system will ask user to complete the "Make Payment" procedure. **Step 6:** User's address and phone number will be provided to the ambulance driver by the system. Also, system will let user to know the information of the driver.

Alternative course of events:	**Step 3a:** User may choose “Need ICU Ambulance”.	**Step *4a:** If user take too long time, system will display “Time out” **Step *4b:** If user inputs wrong option, system will display “Invalid option” **Step *4c:** If there is no ambulance available, system will display “not Available”
Precondition:	User need to be signed in.	
Postcondition:		System must provide the contact number of the user to the ambulance driver as soon as the payment is done by the user.

Access Patient Portal:

Table 8: Access patient portal

Use Case Name:	**Access Patient Portal**	
Actor(s):	Admin, Patient Portal Database system, Nurse/Ward boy (on-duty)	
Description:	This use case describes the process accessing patient test reports and other information by the administration	
Reference ID:	EHS-008	
Typical course of events:	**Actor Action** **Step 1:** Click on "Access Patient Portal". **Step 2:** Enter patient ID or bed and unit no. **Step 4:** Admin will choose "Access Repot".	**System Response** **Step 3:** If information matched system will display (i) Access Report, (ii) View Ventilation Reading and (iii) Update Health Report **Step 5:** System will display the updated test reports of the particular patient.
Alternative course of events:	**Step 4a:** Admin will choose "Update Health Report".	**Step 3a:** If information did not match, system will display "Invalid Information". **Step 5a:** System will display the updated ventilator reading

	Step 6: Admin will add his comment on the patient health	**Step 7:** System will add this with the current time and date. **Step 8b:** System will remember new updates.
Precondition:	Admin needs to be signed in.	
Postcondition:		System must remember the changes made by the Admin

Update Covid Corner:

Table 9: Update covid corner

Use Case Name:	Update Covid Corner	
Actor(s):	Admin, Combined Hospital Database system.	
Description:	This use case is to update the covid corner information.	
Reference ID:	EHS-009	
Typical course of events:	**Actor Action** **Step 1:** Click on "Update Covid Corner". **Step 3:** Admin choose "Update ICU". **Step 4:** Admin will update empty Covid corner's bed no and unit no of current time.	**System Response** **Step 2:** System will display 3 options: (i) Update for ICU (ii) Update Ventilation unit (iii) Update Covid unit **Step 5:** Combiner Hospital Database system will remember the changes made by the Admin.
Alternative course of events:	**Step 3a:** User choose "Update Ventilation unit". **Step 3b:** User choose "Update Covid Unit".	
Precondition:	Admin must be signed up.	
Postcondition:		System must remember the changes made by the Admin.

Check Oxygen Availability:

Table 10: Check Oxygen Availability

Use Case Name:	Check Oxygen Availability	
Actor(s):	Admin, Nurse/Doctor(On-duty), Supplier	
Description:	This use case describes how much oxygen is using.	
Reference ID:	EHS-0010	
Typical course of events:	**Actor Action** **Step 1:** Click on "Check Oxygen Availability". **Step 3:** Admin will choose "Check Current Usage".	**System Response** **Step 2:** System displays (i) Check Current Usage and (ii) Order Required Quantity **Step 4:** System will display the total Oxygen usages in current time updated by the on-duty nurse or doctor.
Alternative course of events:	**Step 3:** Admin will choose "Order Required Quantity". **Step 5a:** Admin will input the amount.	**Step 4a:** System will ask the amount. **Step 6a:** System will provide an urgent message to the supplier regarding the ordered amount of the Oxygen.
Precondition:	Admin needs to be signed in.	

Postcondition:		System must update its data according the secondary actors.

Activity Diagram
Registration: EHS-001

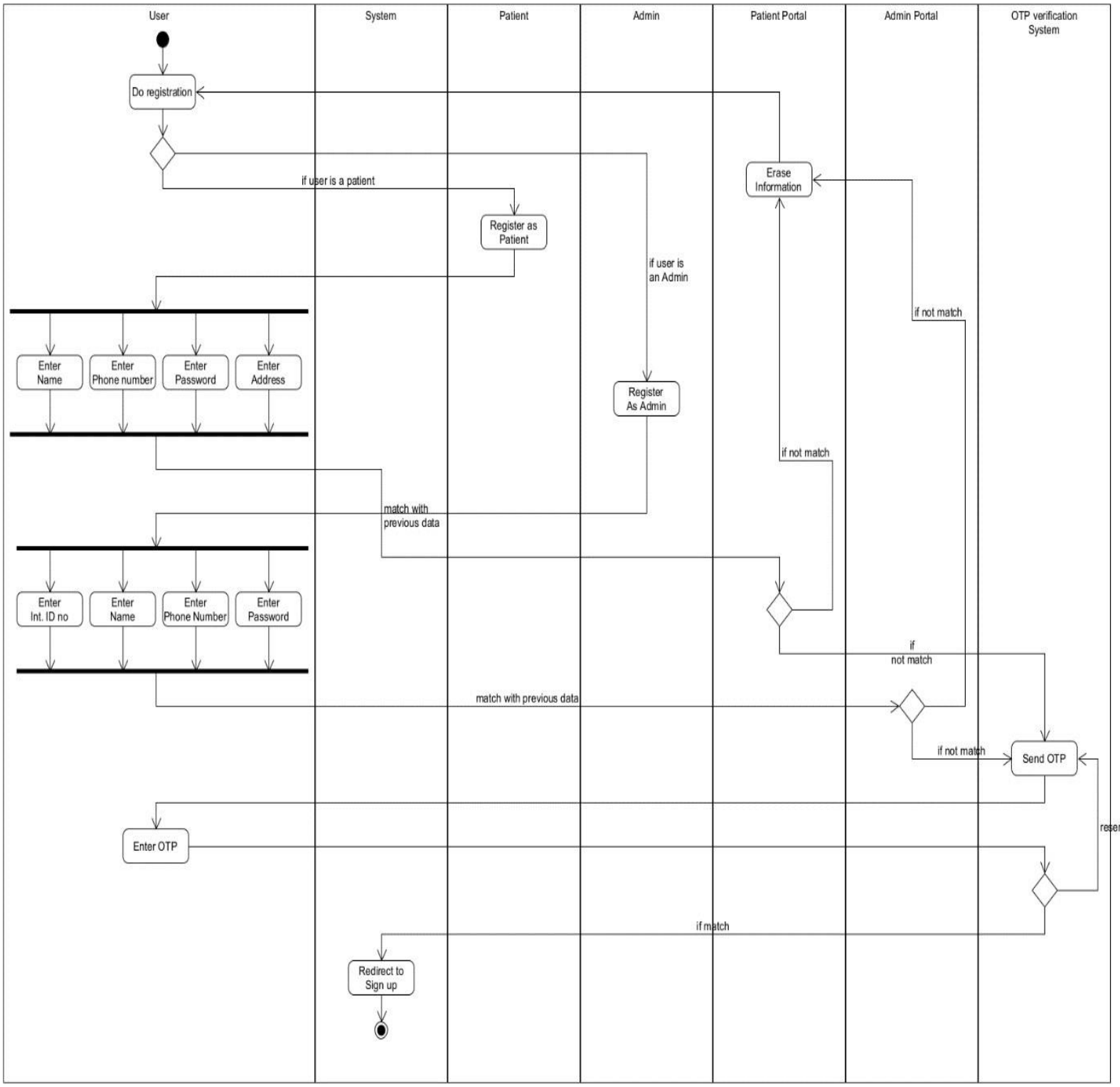


Figure 1: AD_EHS-001

Login: EHS-002

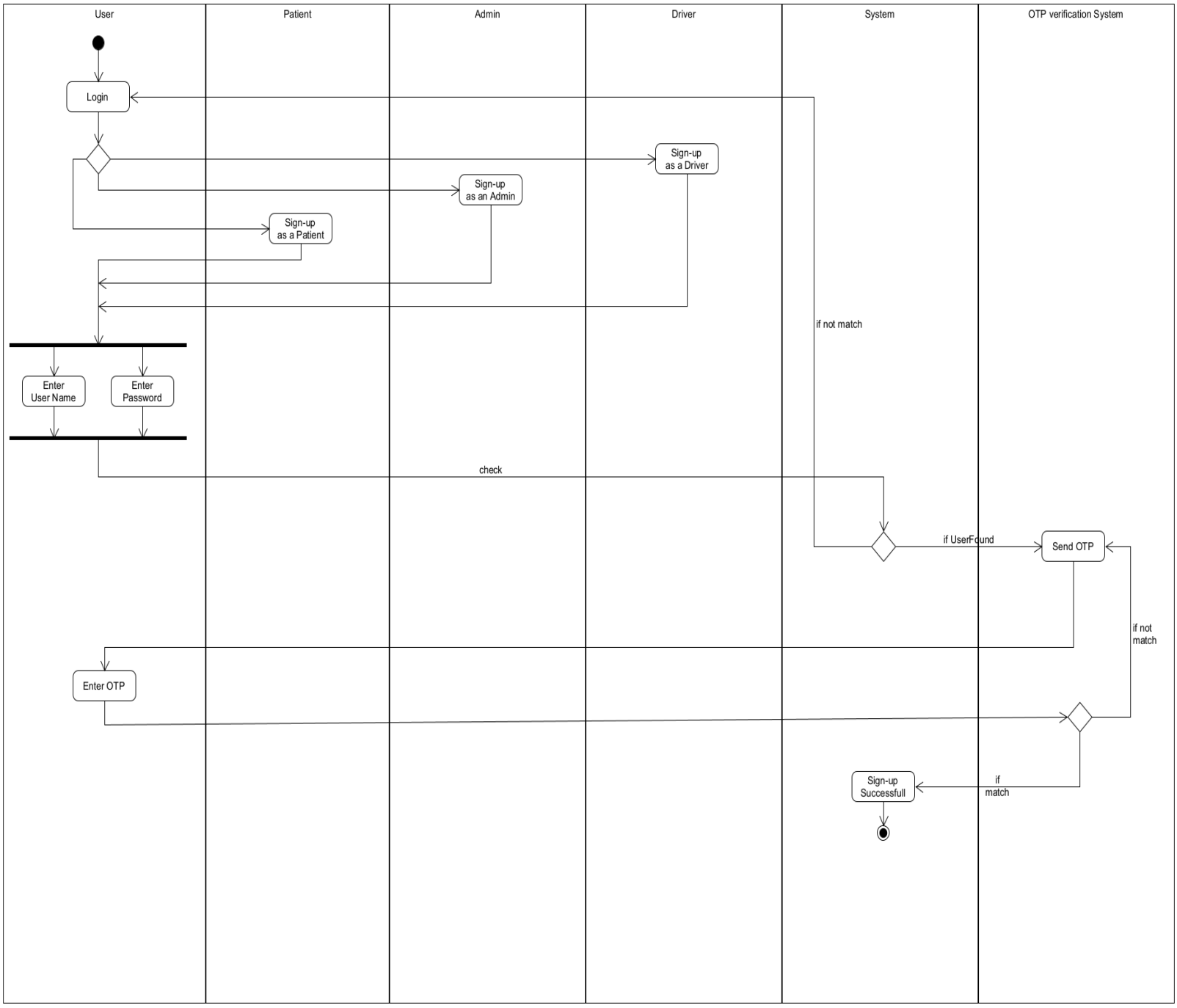


Figure 2: AD_EHS-002

Search for Covid Corner: EHS-003

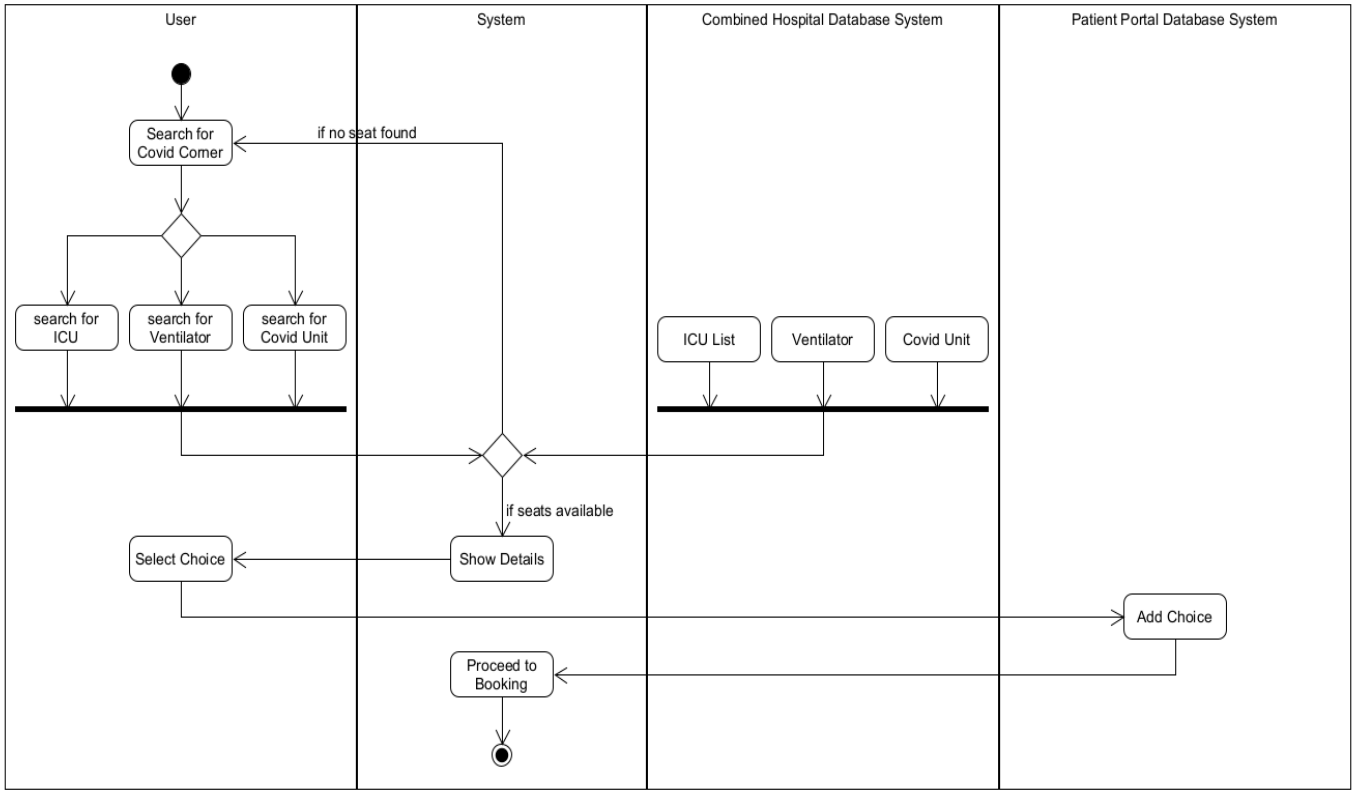


Figure 3: AD_EHS-003

Proceed to Booking: EHS-004

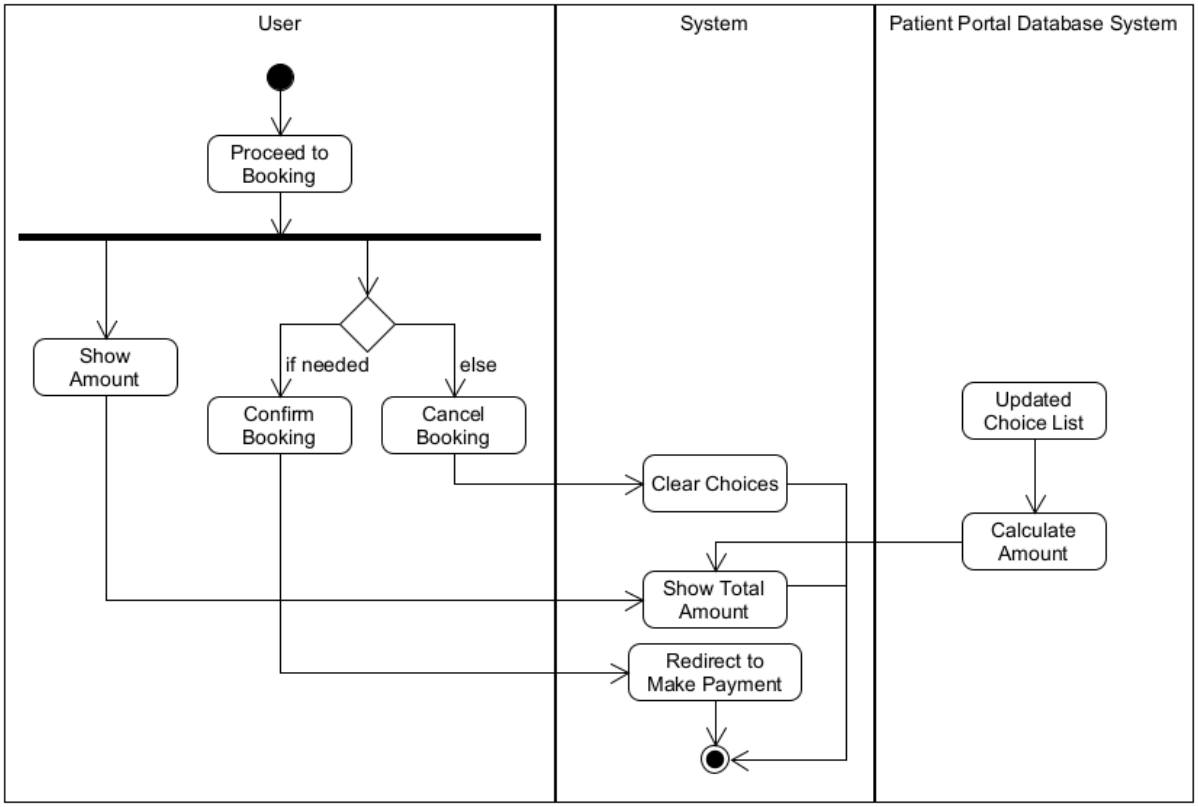


Figure 4: AD_EHS-004

Make Payment: EHS-005

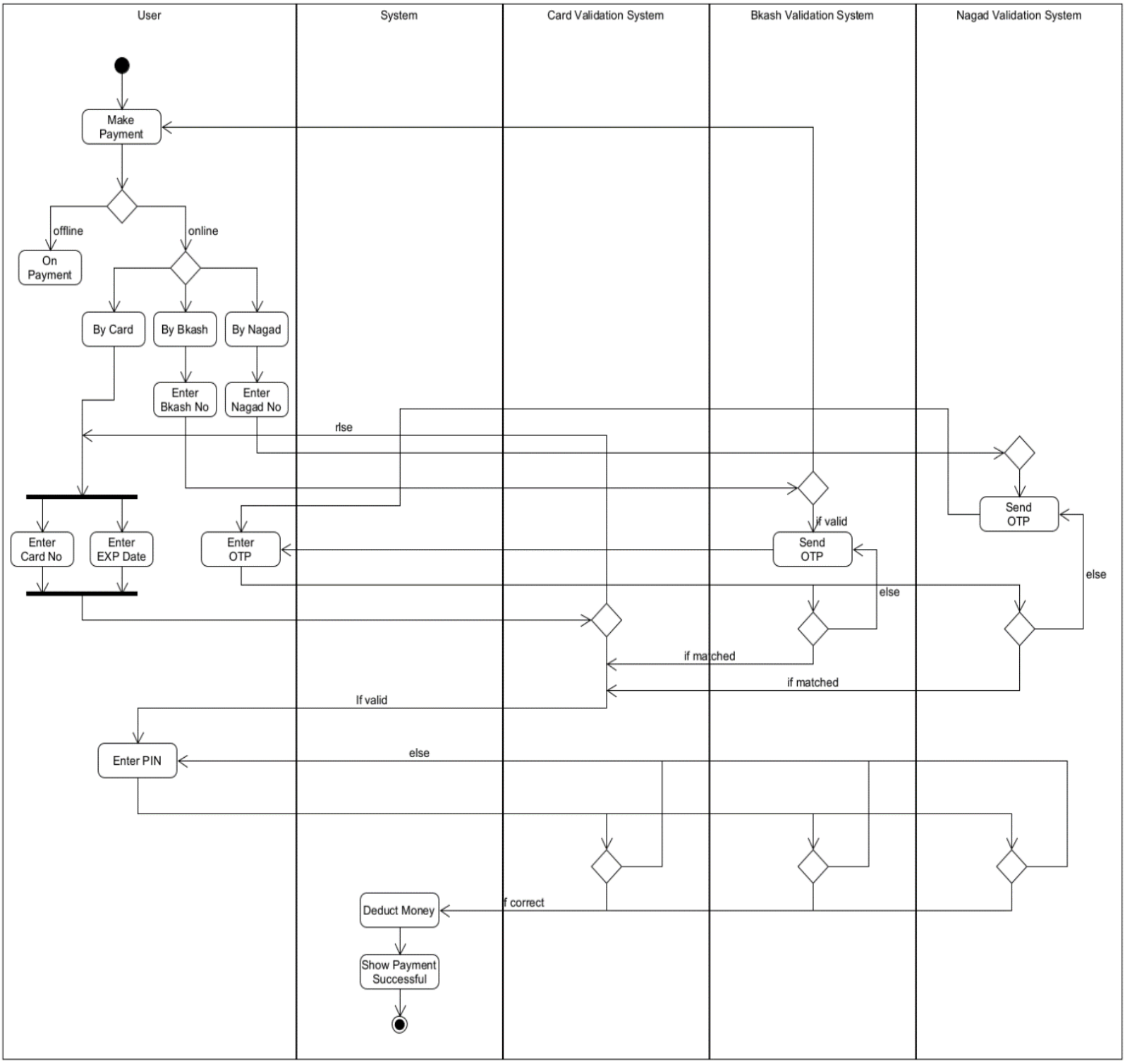


Figure 5: AD_EHS-005

Access Report: EHS-006

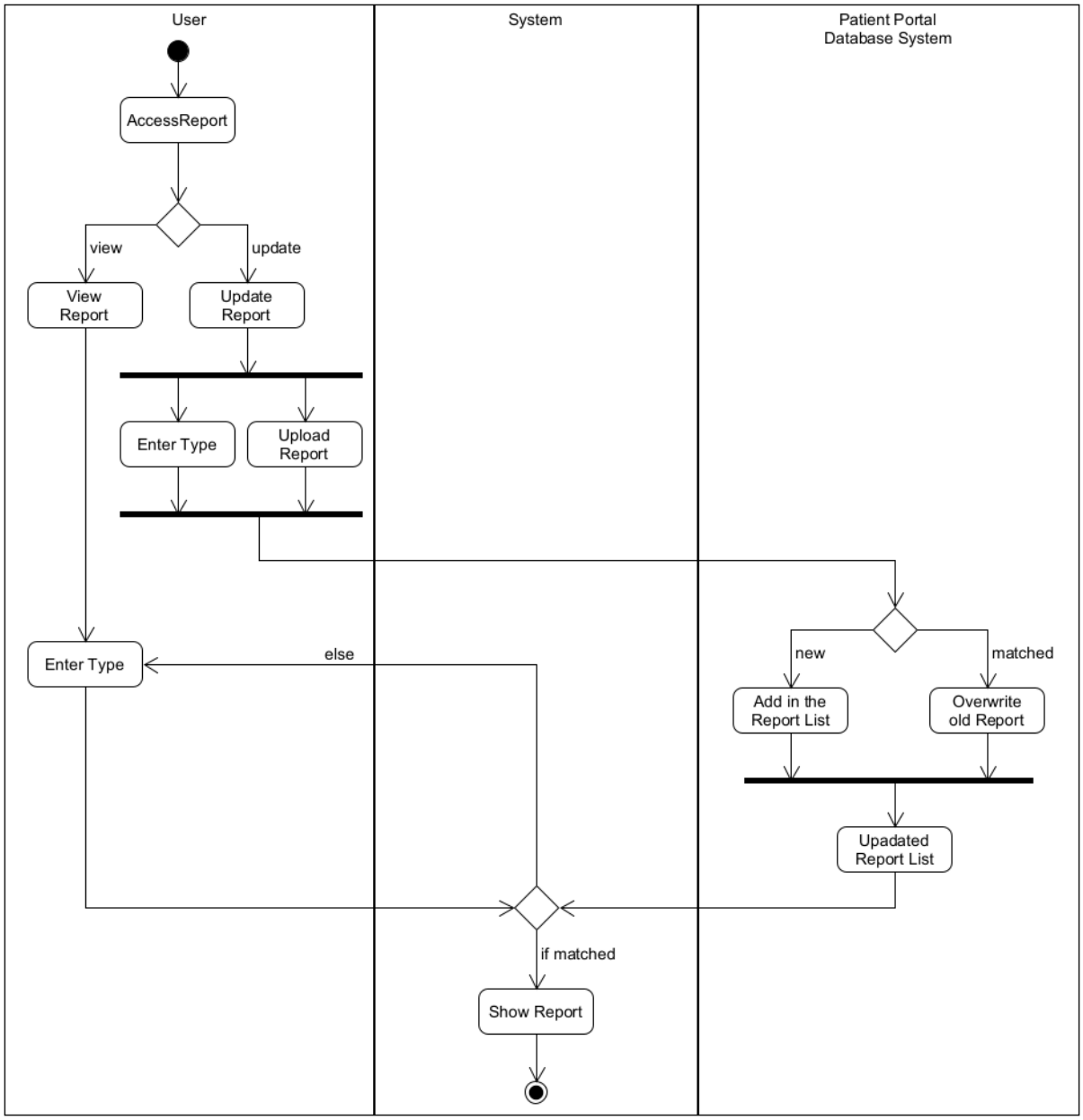


Figure 6: AD_EHS-006

Need Transport: EHS-007

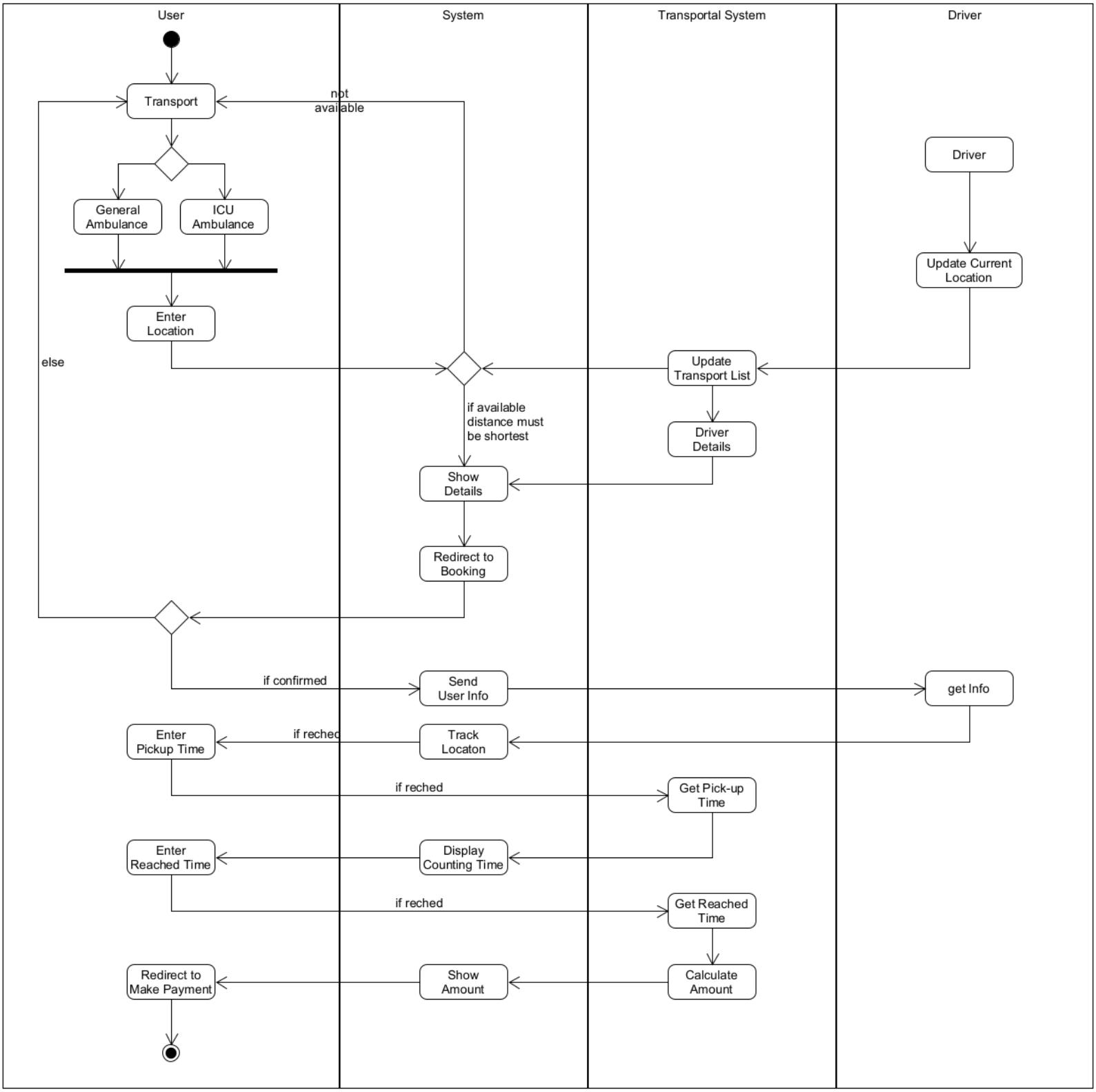


Figure 7: AD_EHS-007

Access Patient Portal: EHS-008

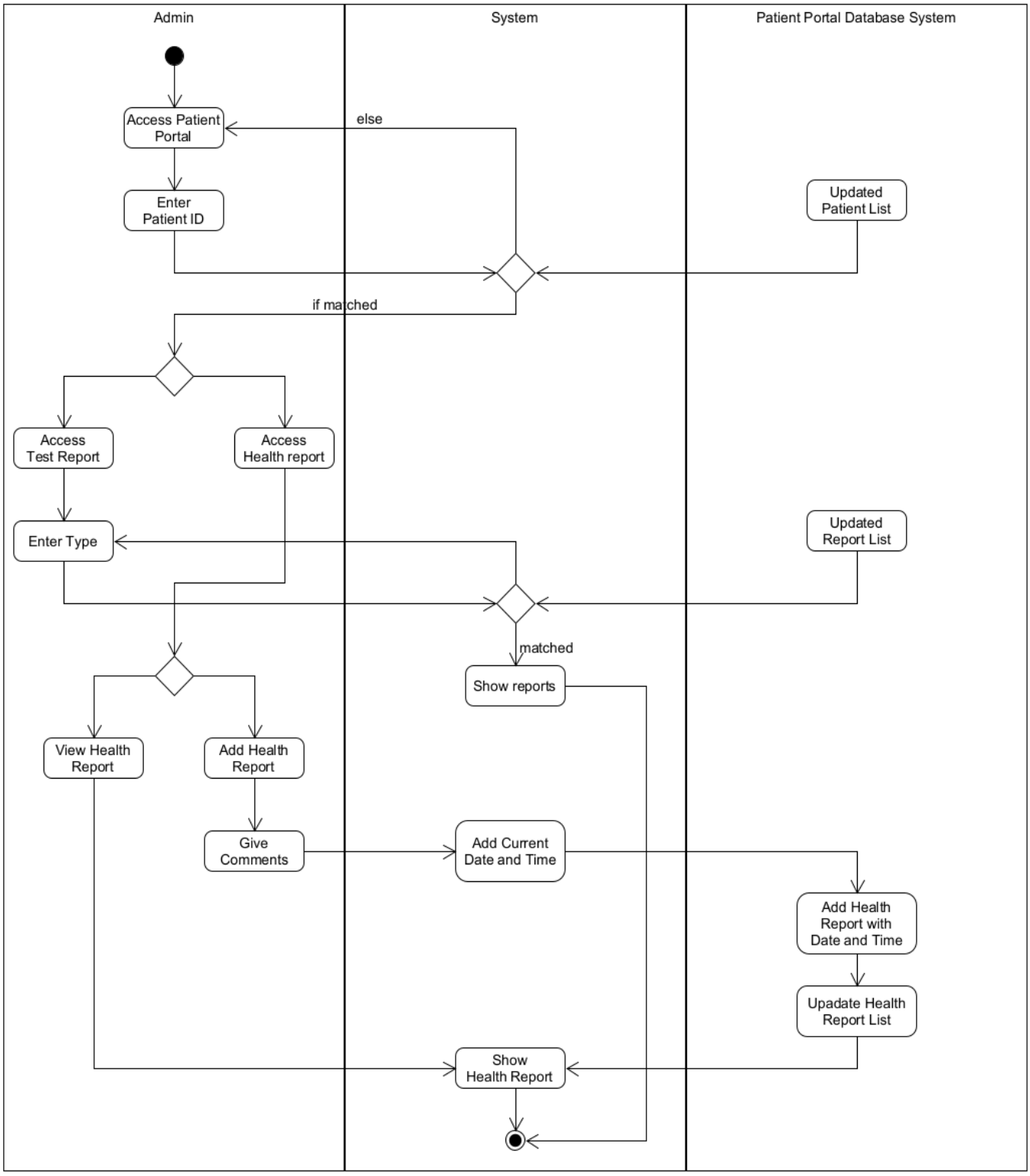


Figure 8: AD_EHS-008

Update Covid Corner: EHS-009

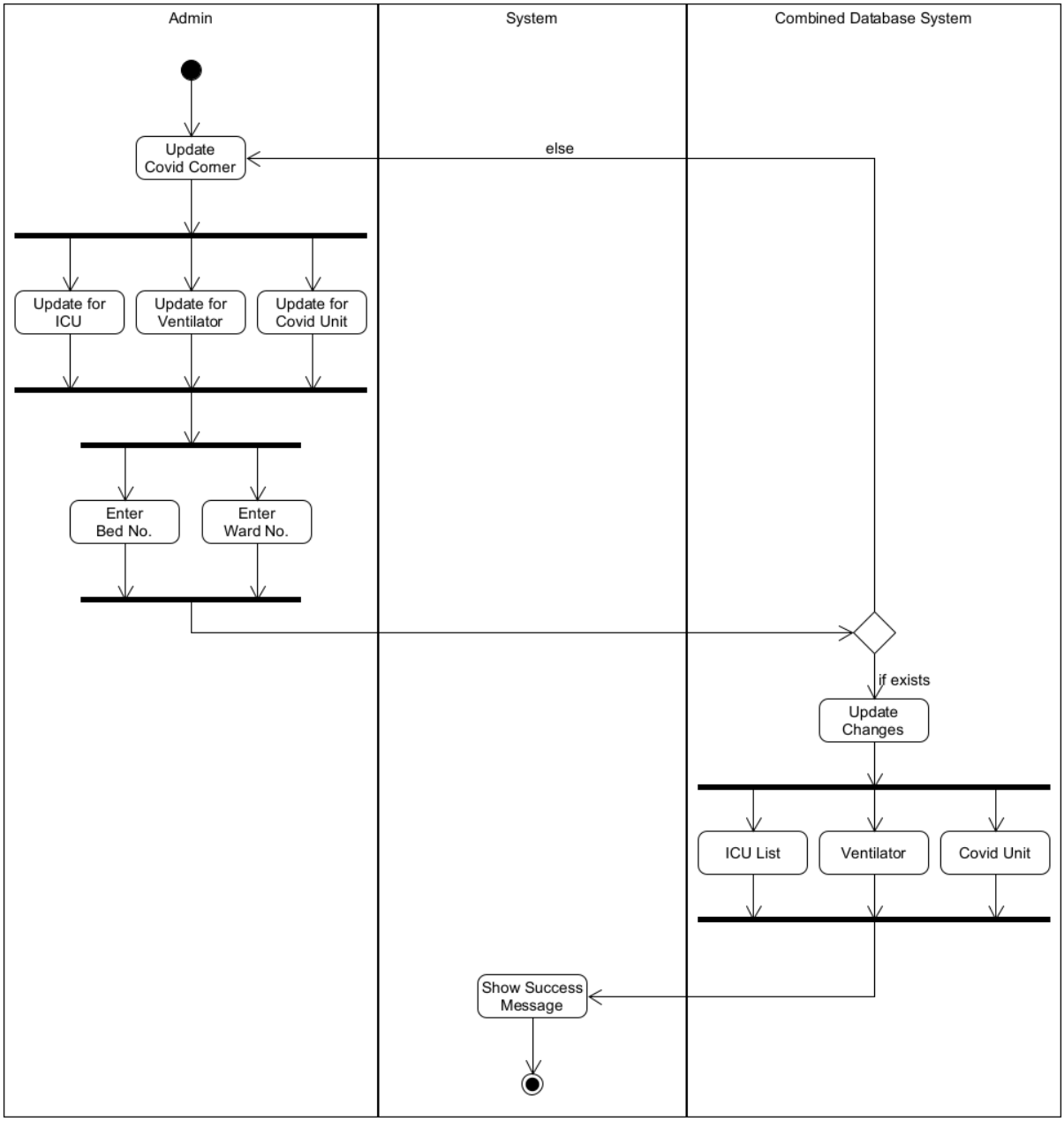


Figure 9: AD_EHS-009

Access Oxygen Corner: EHS-010

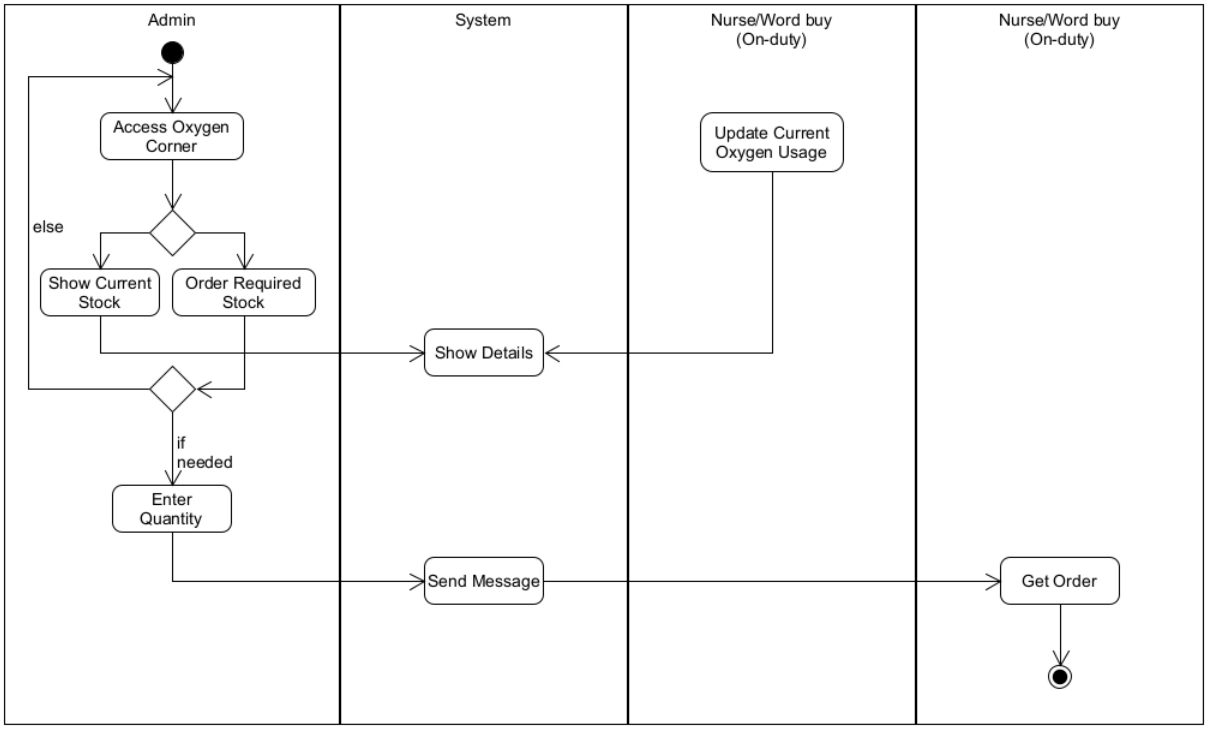


Figure 10: AD_EHS-010

Sequence Diagram
Registration: EHS-001

➢ Registration for Patient:

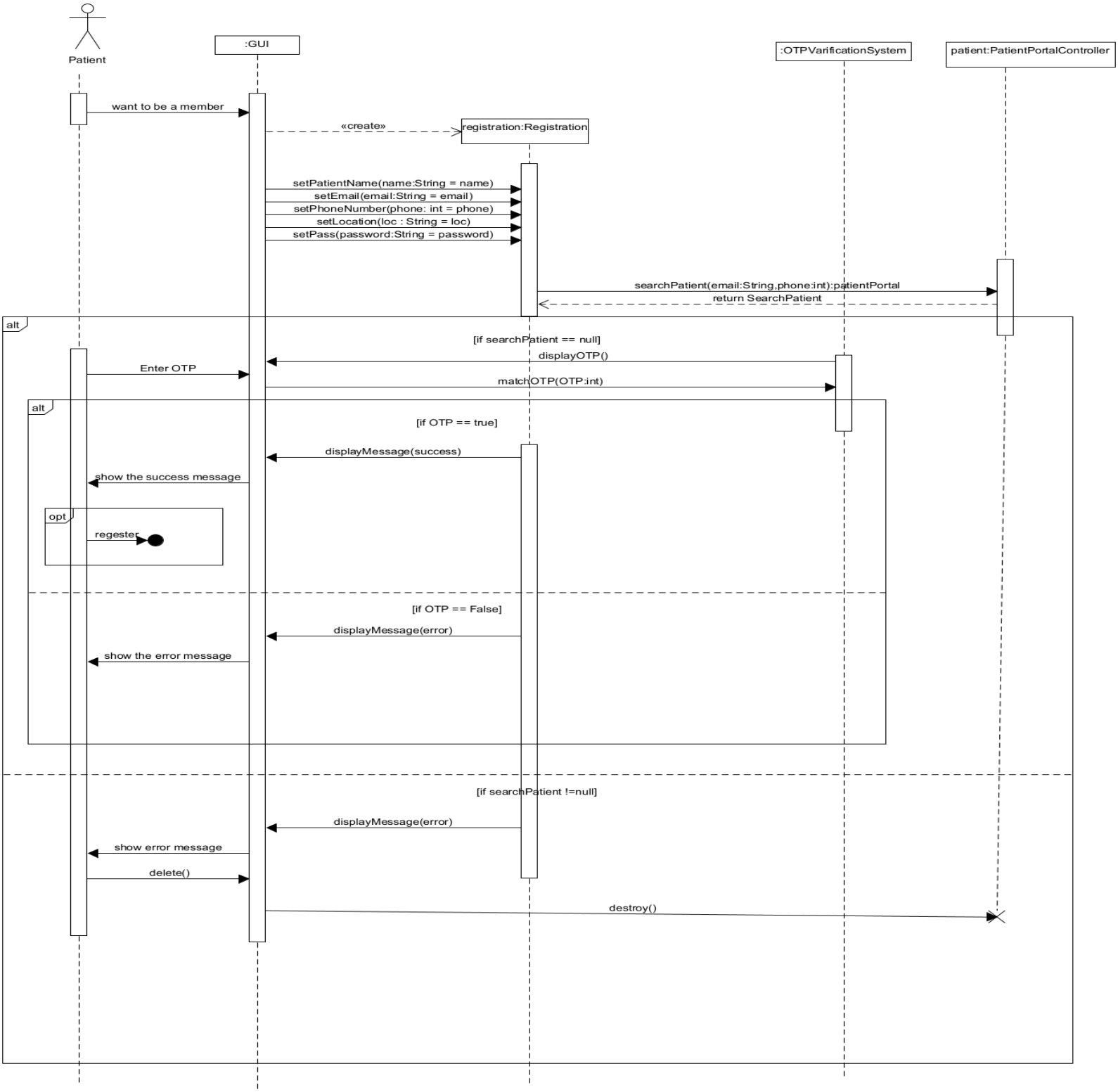


Figure 11: SD_EHS-001(1)

Description:

The above sequence diagram is the registration procedure for patient where a patient need to provide their personal information such as name, phone number, password etc. System will create patient object for storing the new account information that admin has provided. There also have OTP system. If patient forget their password then the system will send them an OTP code, patient have to enter the code. If the code is correct, then the patient can access but if the OTP wrong then the system will send patient the error message commendation personal information storing in patient portal system and the OTP system control by OTP system.

➢ Registration for Driver:

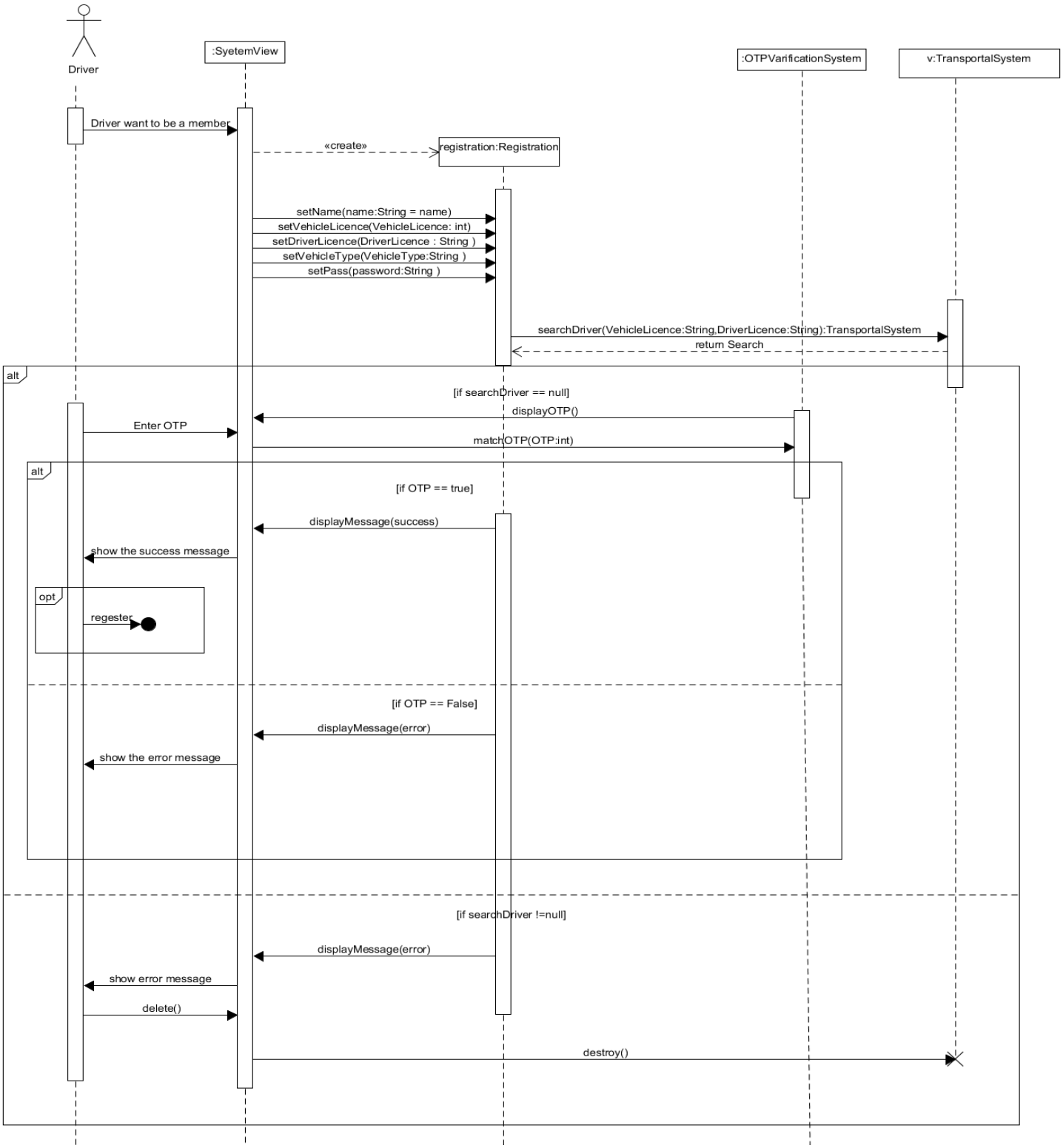


Figure 12: SD_EHS-001(2)

Description:

To begin, the driver will enter his or her login name, license no, vehicle license no, vehicle type and password into the system. As a result, the system will query the database to determine whether the account exists or not. If the data is not found, then system will send an OTP. After getting the OTP, he (driver) must enter his OTP to the system and if it is correct, the system will display the "success" massage on the screen.

- Registration for Admin:

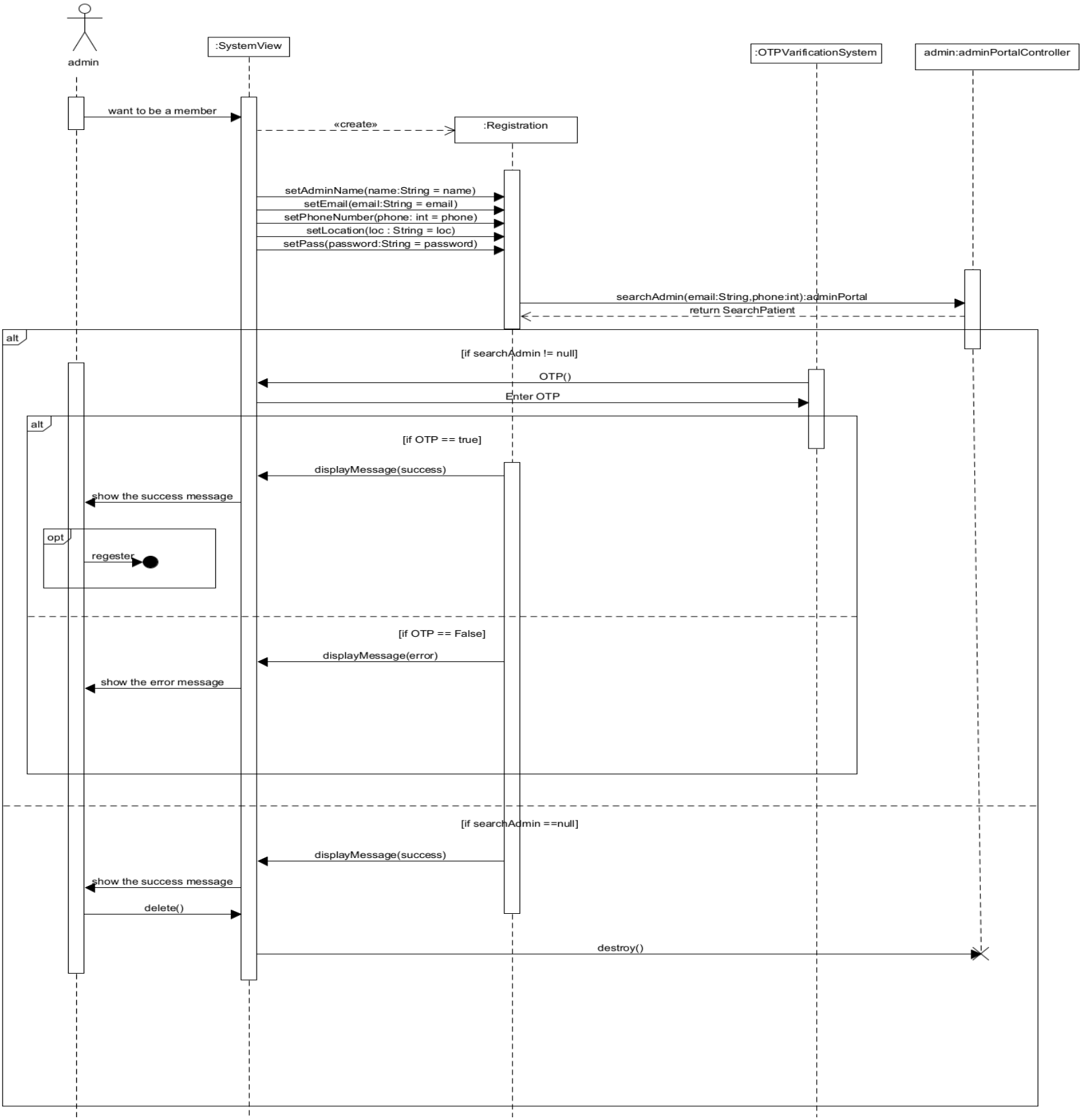


Figure 13: DS_EHS-001(3)

Description:

The above sequence diagram of registration admin needs to provide admin's personal information such as name, phone number ,password and institutional ID etc. System will create an admin object for storing the new account information that admin has provided. There also have OTP system. If admin forget their password then the system will send them an OTP code, admin have entered the code .If the code is correct then the admin can access but if the OTP wrong then the system will send admin the error message command.

Login: EHS-002

- Login process for Admin:

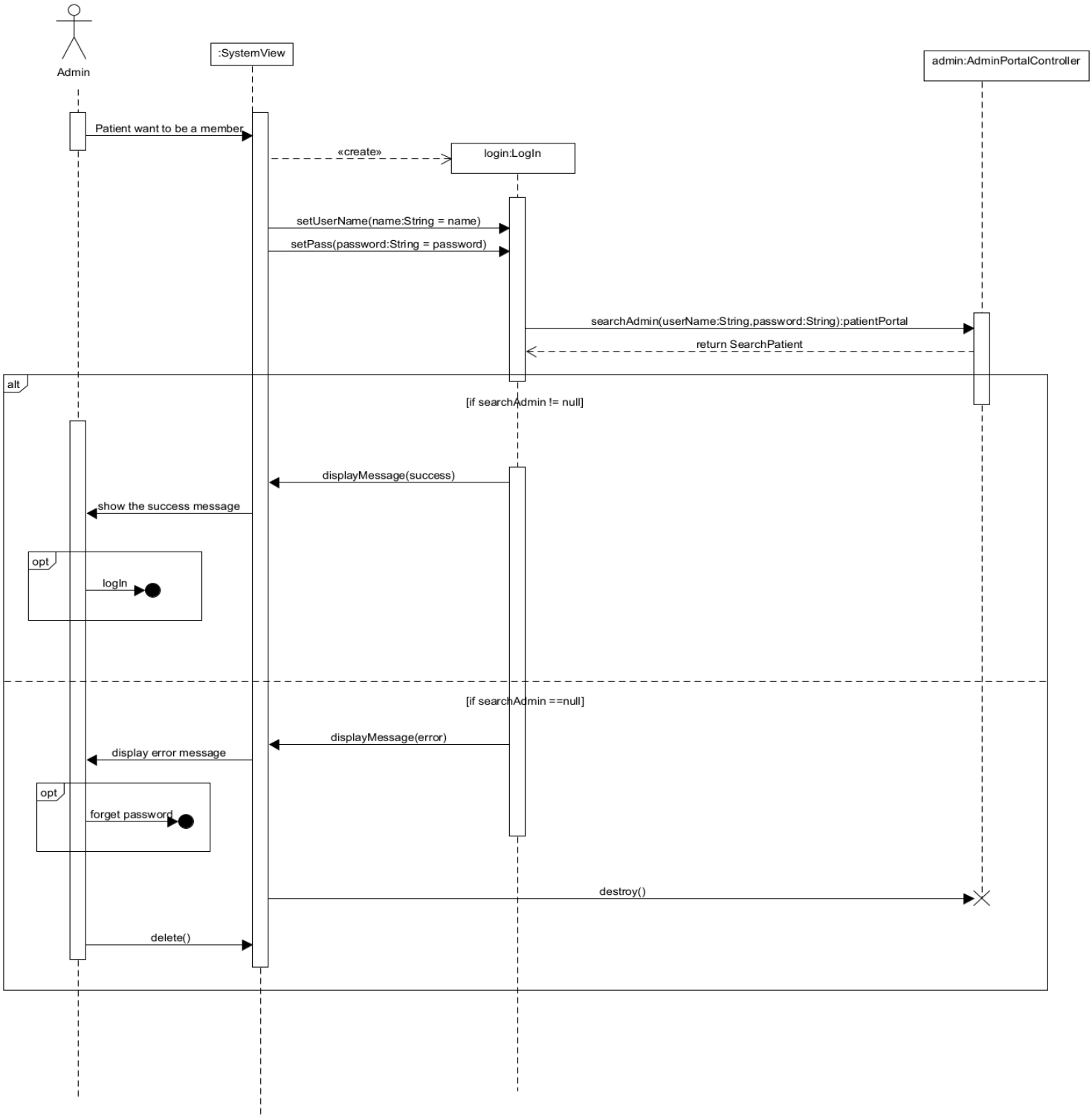


Figure 14: SD_EHS002(1)

Description:

To begin, the admin will enter his or her login ID and password into the system. As a result, the system (admin portal controller) will query the database to determine whether or not the account exists. The system will display the "success" massage on the screen if the admin data matches the system data.

- Login Process for Patient:

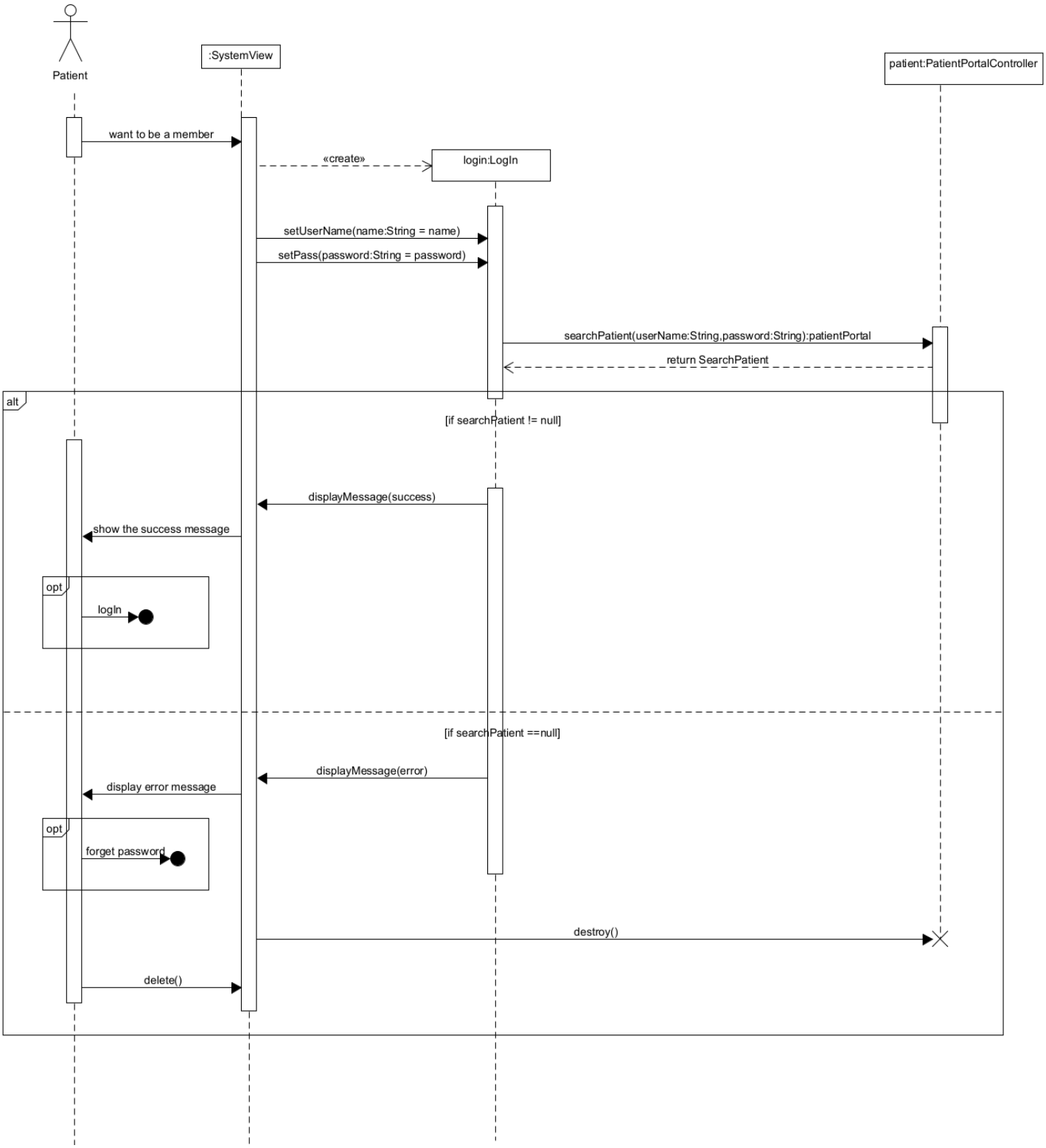


Figure 15: SD_EHS-002(2)

Description:

The above sequence diagram is the login procedure for patient where a patient need to provide their personal phone number and password etc. If provided information is correct, system will show success message or else it will redirect to registration or forget password option.

Search for Covid Corner: EHS-003

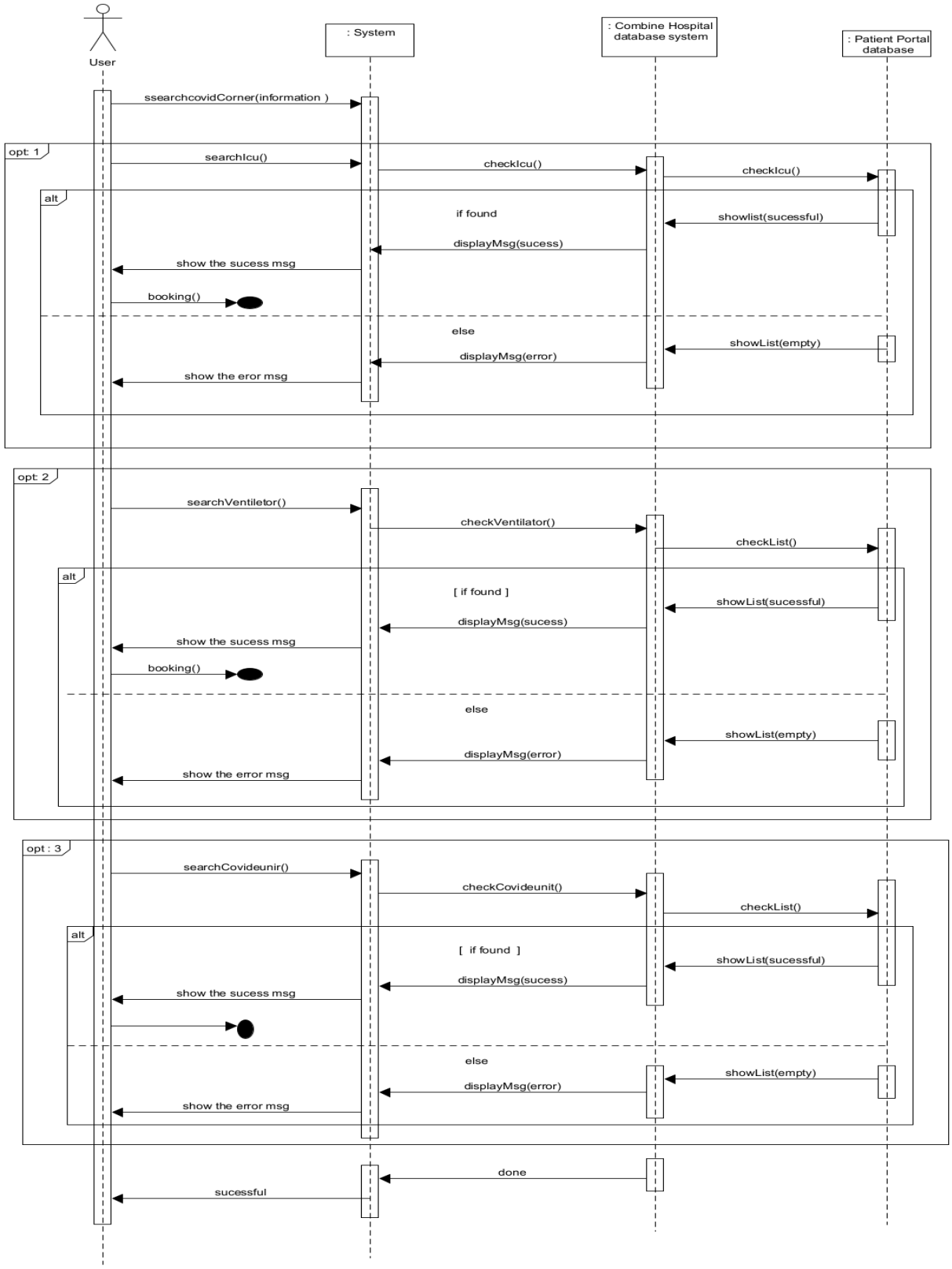


Figure 16: SD_EHS003

Description:

When user want to search covid corner, the user need to click covid corner. And there are three option they are search for ICU, search for Ventilator, search for Covid Unit. After the user selects his preferred option.

When the user selects the search ICU, the system send it to the hospital database system and check the patient's portal database ICU and collects all the information. If the ICU list remains incomplete in the patient's portal database, this list will be sent to the user through the system and the user will be able to book it; If there is no list, the user will not be able to book it. When the user selects the search ventilator, the system send it to the hospital database system and check the patient's portal database ventilator and collects all the information. If the ventilator list remains incomplete in the patient's portal database, this list will be sent to the user through the system and the user will be able to book it; If there is no list, the user will not be able to book it. When the user selects the search covid unit, the system send it to the hospital database system and check the patient's portal database covid unit and collects all the information. If the covid unit list remains incomplete in the patient's portal database, this list will be sent to the user through the system and the user will be able to book it; If there is no list, the user will not be able to book it.

Proceed to Booking: EHS-004

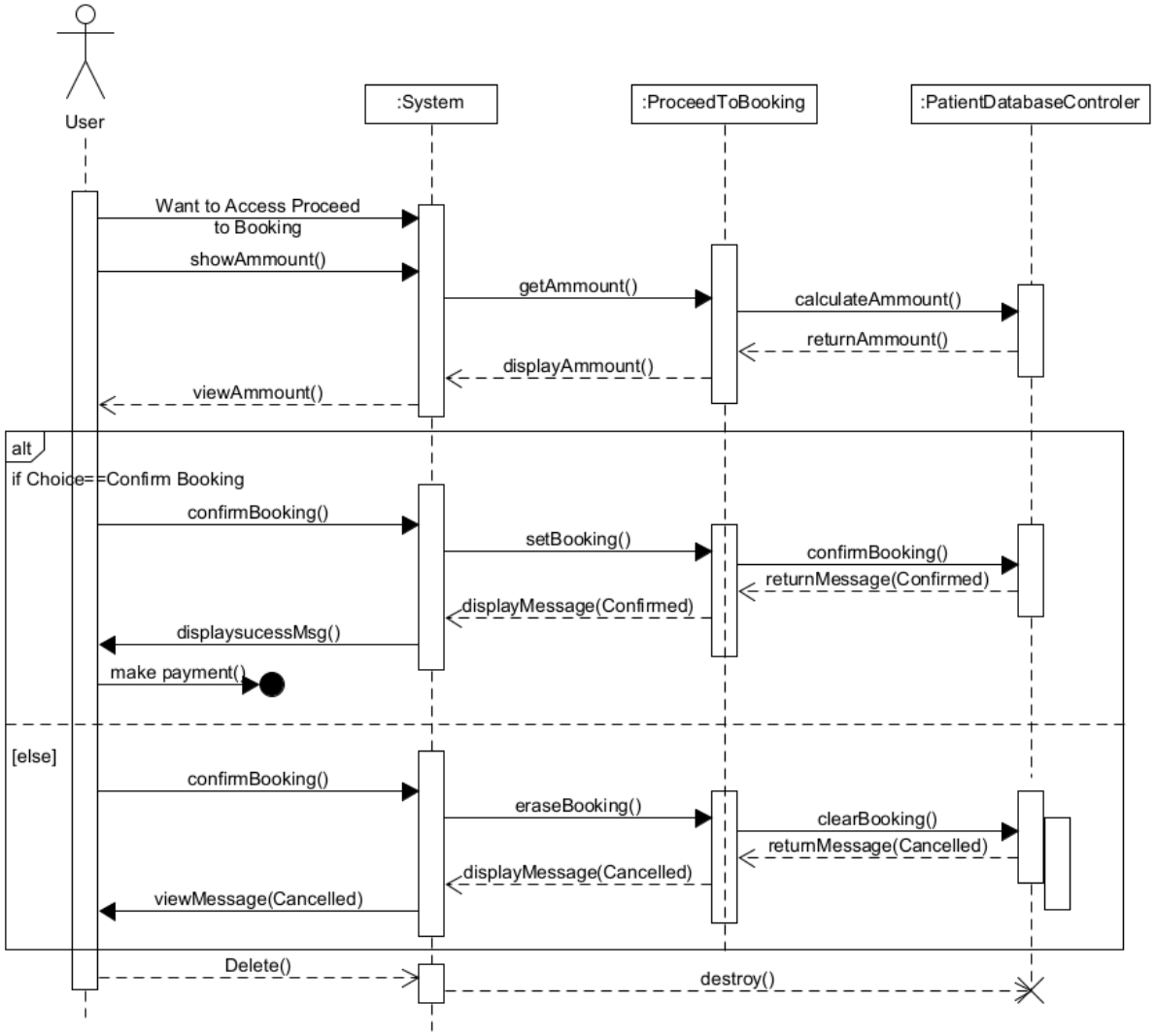


Figure 17: SD_EHS-004

Description:

The general procedure of booking an emergency health service is that the user will first search booking. Then user click the booking. Then system will display amount, confirm, cancel. After that, the user select the option of his choice. The system will then send all this information to the Patient Database Controller. the patient database will store information that user has provided, and the process will

continue. If user confirm booking there will be a payment process and if user cancel booking system show cancelled message.

Make Payment: EHS-005

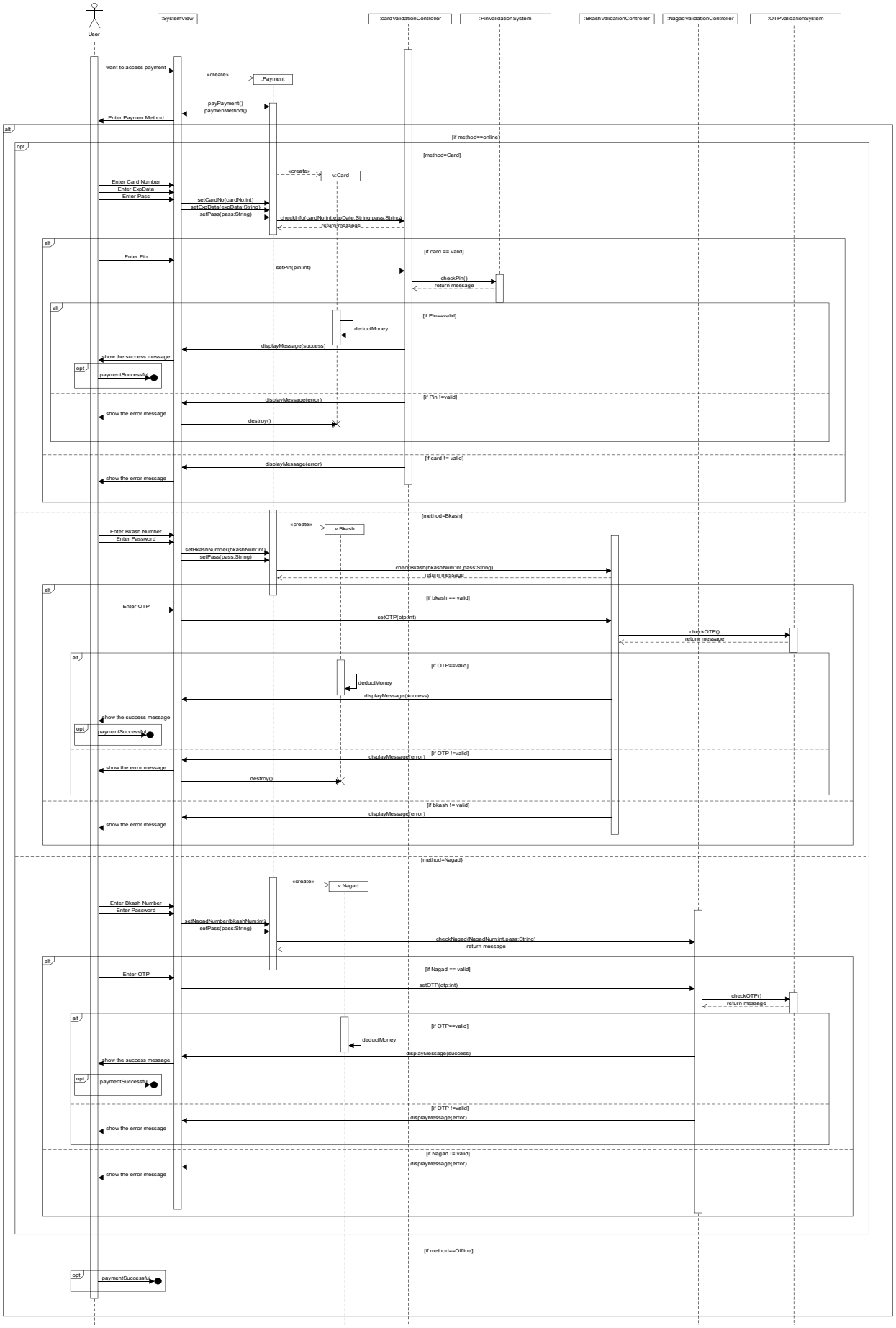


Figure 18: SD_EHS-005

Description:

When the payment process is triggered, the member is required to select the payment method. At initially, the member will have two alternatives for payment: offline or online. You can pay in cash if you wish to pay offline. However, if you want to pay online, you will have three additional options: Bkash, Nagad, and card. If you wish to use the card, you'll need to write down the card number and expiration date. If the account number is genuine, the system will ask for your PIN number. If the PIN number is accurate, the money will be deducted from the member's account; if it is incorrect, the system will return to the card payment option. If a member wishes to pay via Bkash or Nagad, he must first input his or her account number, which must be valid for the system to transmit an OTP code number to his or her mobile phone. The member then enters his or her OTP code into the system, and if it is correct, the system will ask for the member's pin number. Then he will enter his pin code, which if right, will deduct the money from his account and display a success message. However, if the account number, OTP number, or pin number is invalid, the system will revert to the payment option.

Access Report: EHS-006

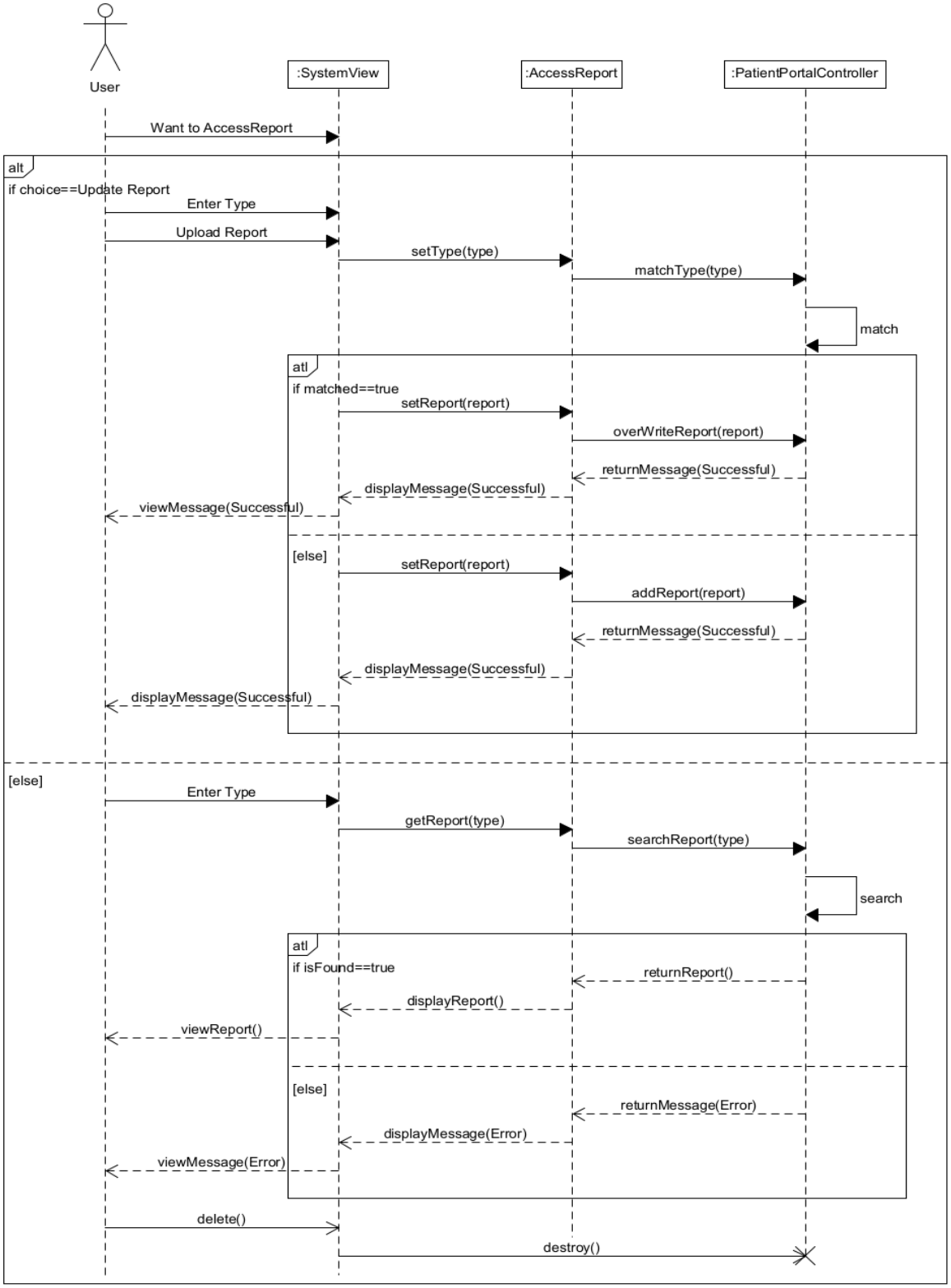


Figure 19: SD_EHS-006

Description:

When user access report they have two choice update report and view report . If the admin choice view test report user have to enter the type of the test report and upload the test report .User send the set type () and match type() command to the system .If the report matched user send set report() and over write report() command to the system and system will send a successful message and display successful message will be called. If the user choice view test report user must enter the type of the test report and system will search the test report if the report type is unavailable the system returns an error message and display an error message.

Need Transport: EHS-007

- Location update procedure by the driver

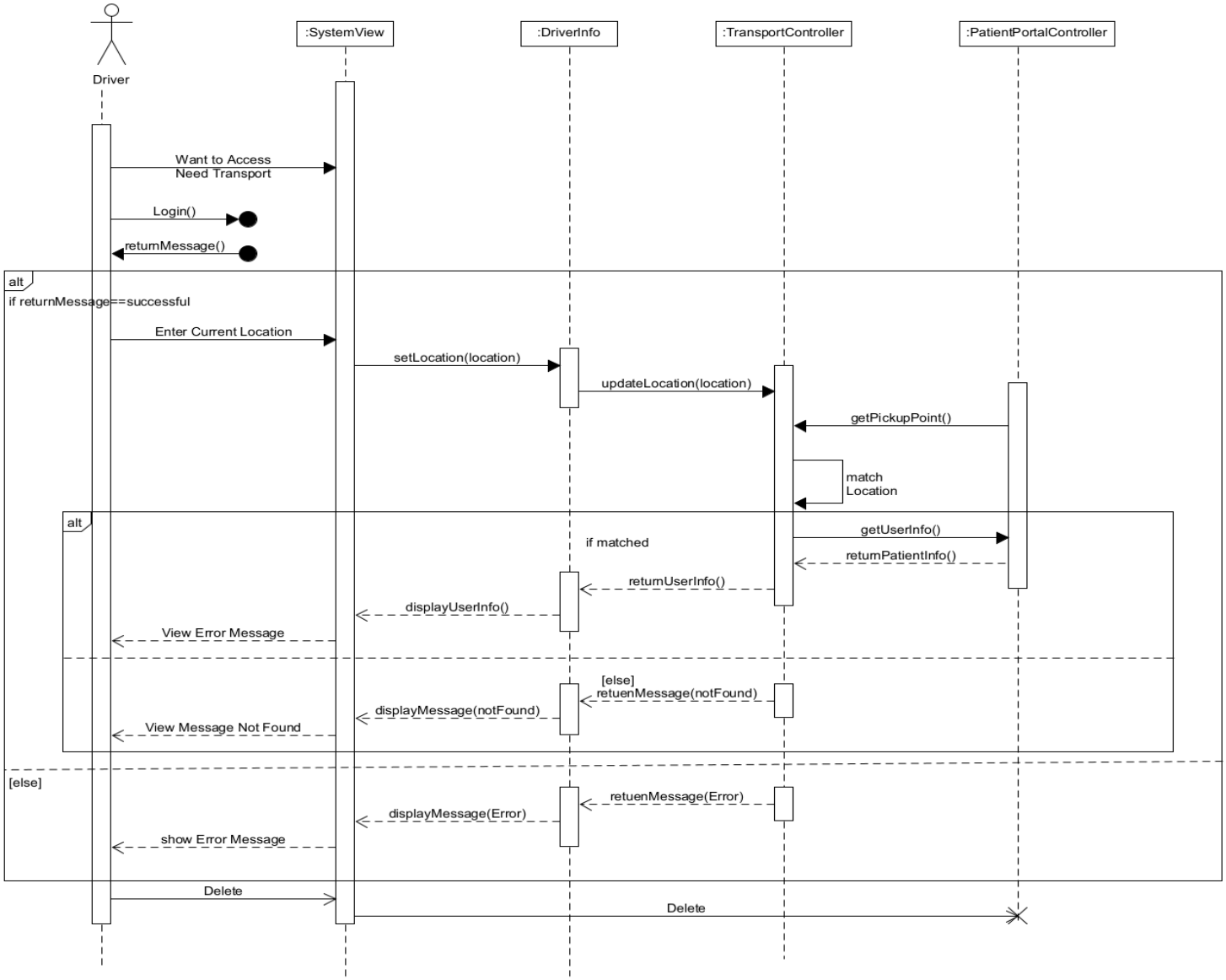


Figure 20: SD_EHS-007(1)

Description:

In order to receive an order, the driver must first enter his present location. The system will then check whether or not the driver has logged in. If the user has

logged in, the process will continue. Otherwise, the driver must log in first. He (driver) gets the patient pick-up point after setting the location. If the location is match, the driver will send a successful message to the system. He (driver) will then locate the user's (patient's) location on the system. However, if he (the driver) is unable to locate any information, he will provide an error message. Another side, if the location does not match, the driver will send an error message to the system, which the system will display to the user.

➢ User's transport booking procedure

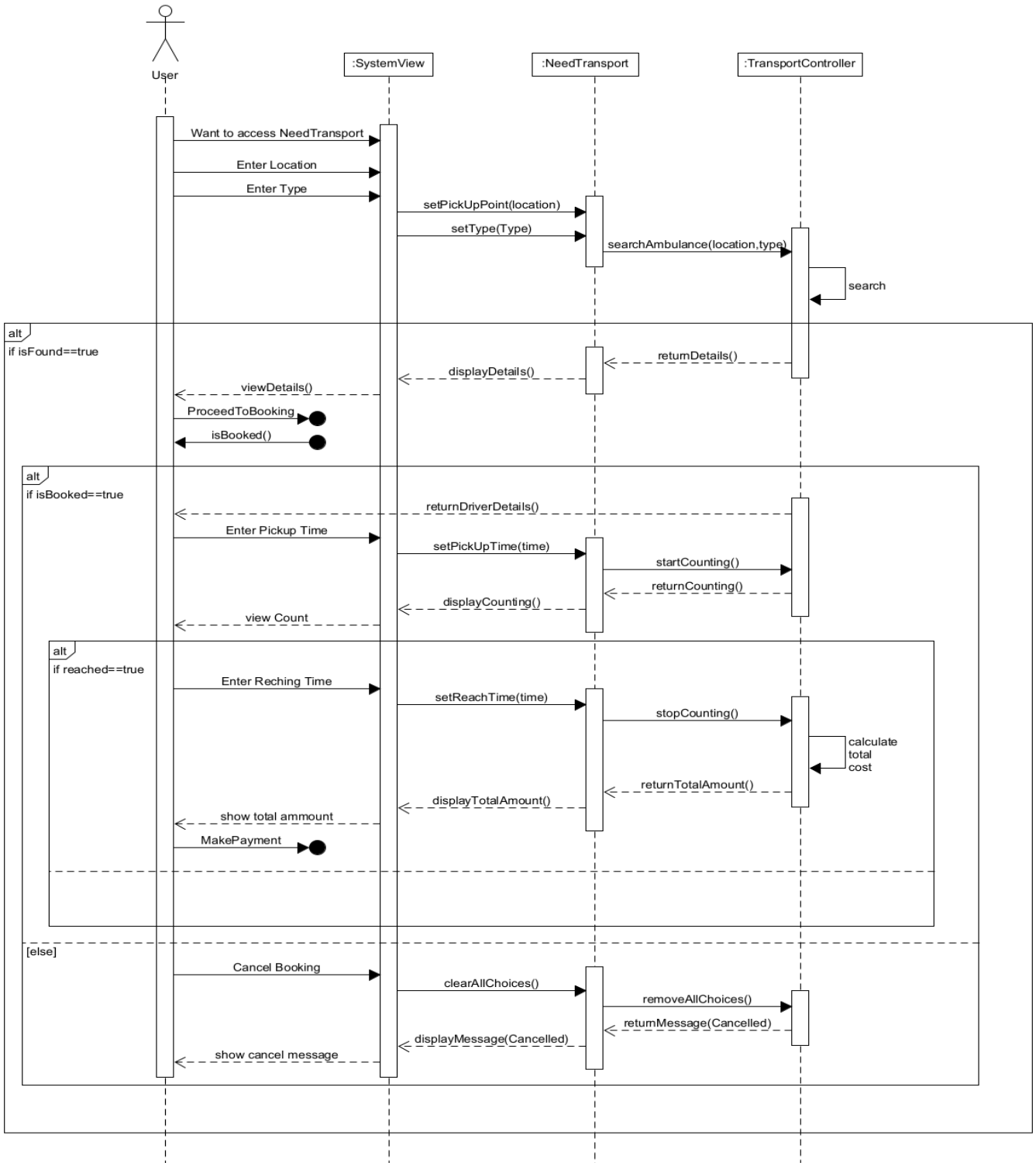


Figure 21: SD_EHS-007(2)

Description:

In order to get an ambulance, the user must first search for one by entering his or her location and type. The system will then verify that the user has logged in or not. The process will continue if the user has logged in. Otherwise, the user must first log in. If there are available any ambulance, then the system will return the details of the ambulance. The user can set the schedule and specify the pick-up time. After set that the transport controller will receive that data and return the view count massage and display the screen. After the ambulance arrives, the money counting will come to an end. The whole amount of money will then be displayed on the user's mobile device. He (the user) can also clear his payment at this point. But, if the user does not wish to reserve an ambulance or there isn't one available ambulance in that moment, the booking can be canceled. The system will display the cancel booking message after user cancel the booking process.

Access Patient Portal: EHS-008

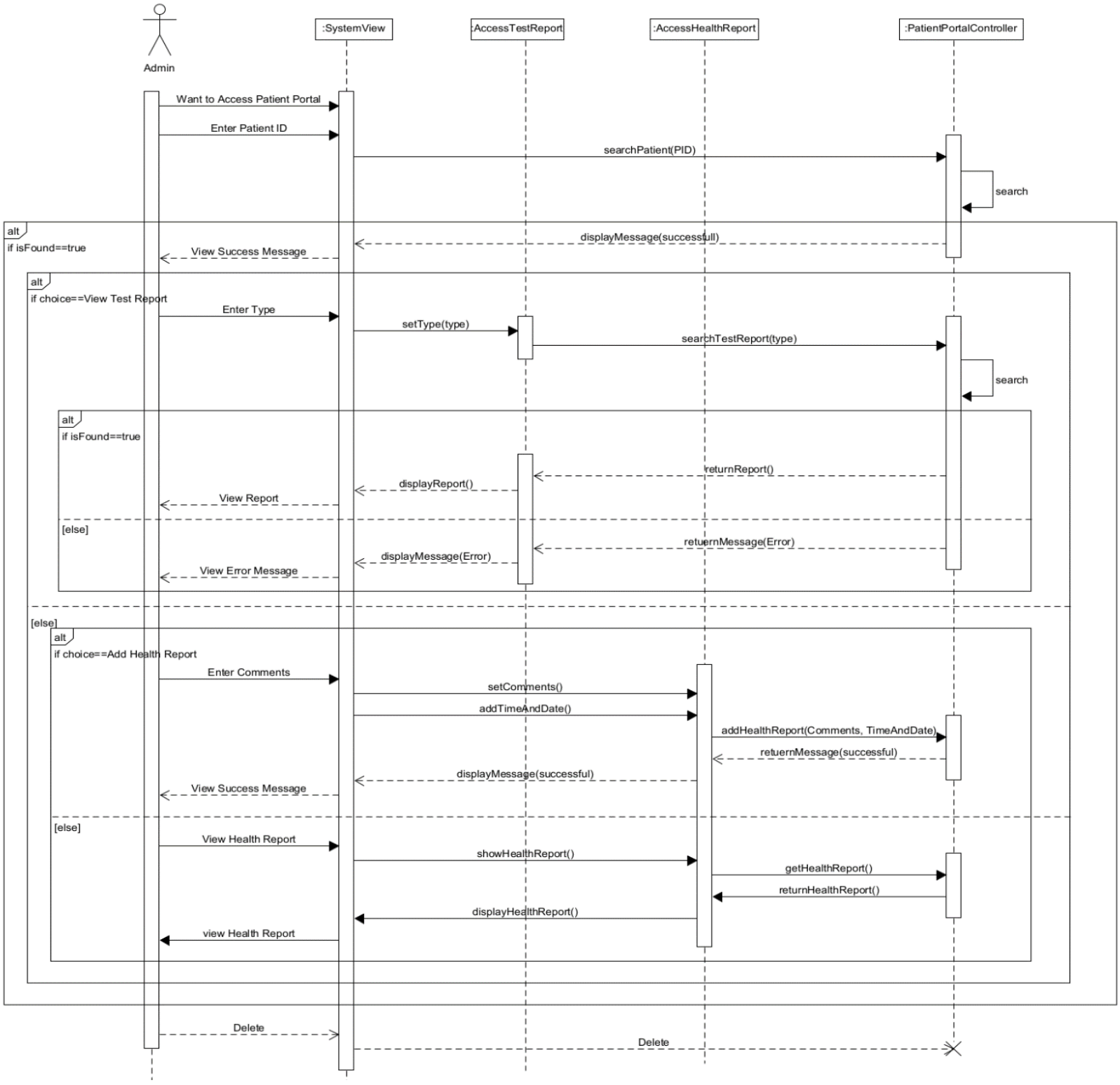


Figure 22: SD_EHS-008

Description:

When an admin (authority) wants to use the oxygen corner, he or she must enter the hospital's private code into our system. After gaining access to our system, he can go to the oxygen corner page. Following that, the screen will have two options: current stock and order required stock. As a result, he (admin) has the freedom to select any alternative. If he selects current stock, the system will display the current oxygen stock in the hospital; however, if he selects order required stock, the system will ask him for an amount! Then he can enter the quantity he requires.

Update Covid Corner: EHS-009

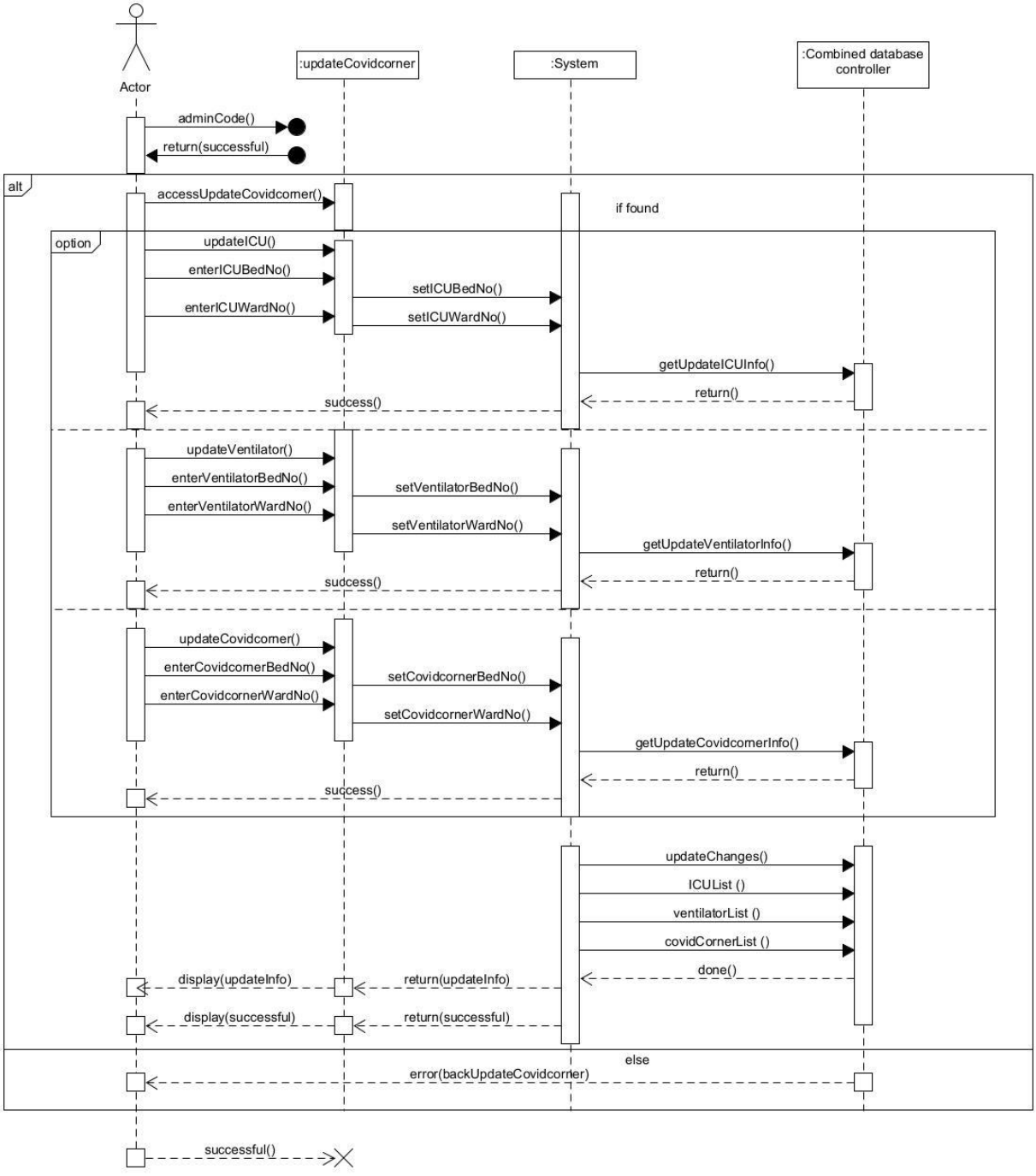


Figure 23: SD_EHS-009

Description:

When an admin wants to update covid corner, he or she must first enter the hospital's confidential code into our system. He can go to the update covid corner page after having access to our system. When he selects update covid corner, he will see three options on the screen: update ICU, update ventilator, and update covid corner. As a result, he (admin) has complete discretion to choose any option. If he wishes to update ICU, he will select that option and enter that information. He'll now choose an ICU bed or ward and enter the new data into the system. The combined database system will receive the update data, and when he (the combined database operator) receives it, he will set the new data, and the system will display a success message. In the same way, ventilator and covid corners can be updated. Lastly, when the combined data receives an update value, the system will display the updated information as well as the successful massage to the admin.

Access Oxygen Corner: EHS-010

- Admin access procedure:

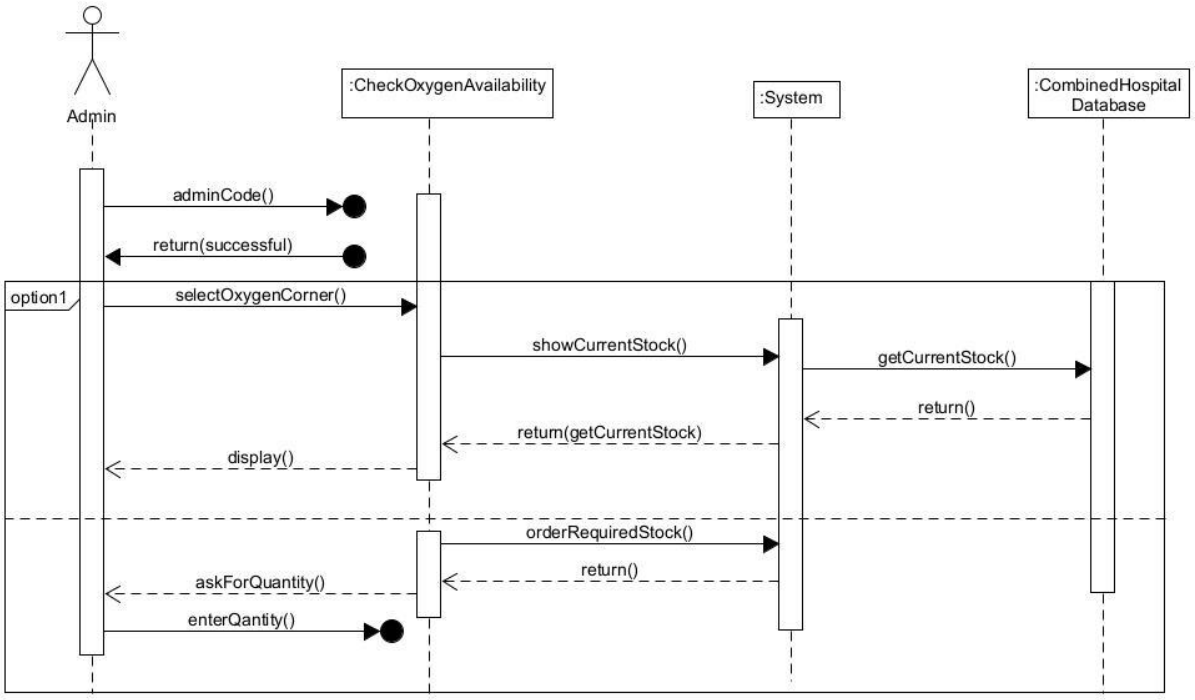


Figure 24: SD_EHS-010(1)

Description:

When an admin (authority) wants to use the oxygen corner, he or she must enter the hospital's private code into our system. After gaining access to our system, he can go to the oxygen corner page. Following that, the screen will have two options: current stock and order required stock. As a result, he (admin) has the freedom to select any alternative. If he selects current stock, the system will display the current oxygen stock in the hospital; however, if he selects order required stock, the system will ask him for an amount! Then he can enter the quantity he requires.

- Oxygen usage updating procedure:

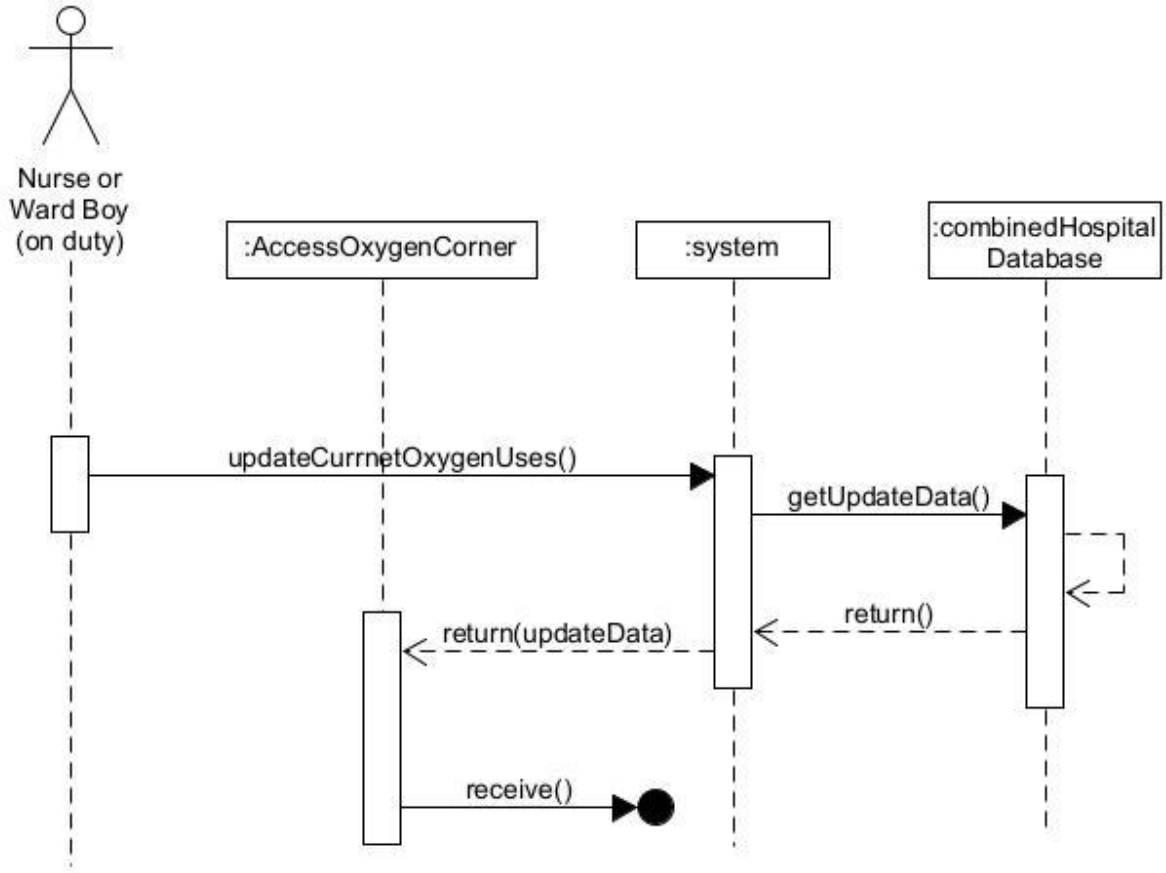


Figure 25: SD_EHS-010(2)

Description:

When an admin requests to see the current oxygen stock in the hospital, the nurse or ward boy will submit the updated information to the combined hospital database. Then the database will send the updated data to the. And the system will show the administrator the most update oxygen information.

- Oxygen's order getting procedure:

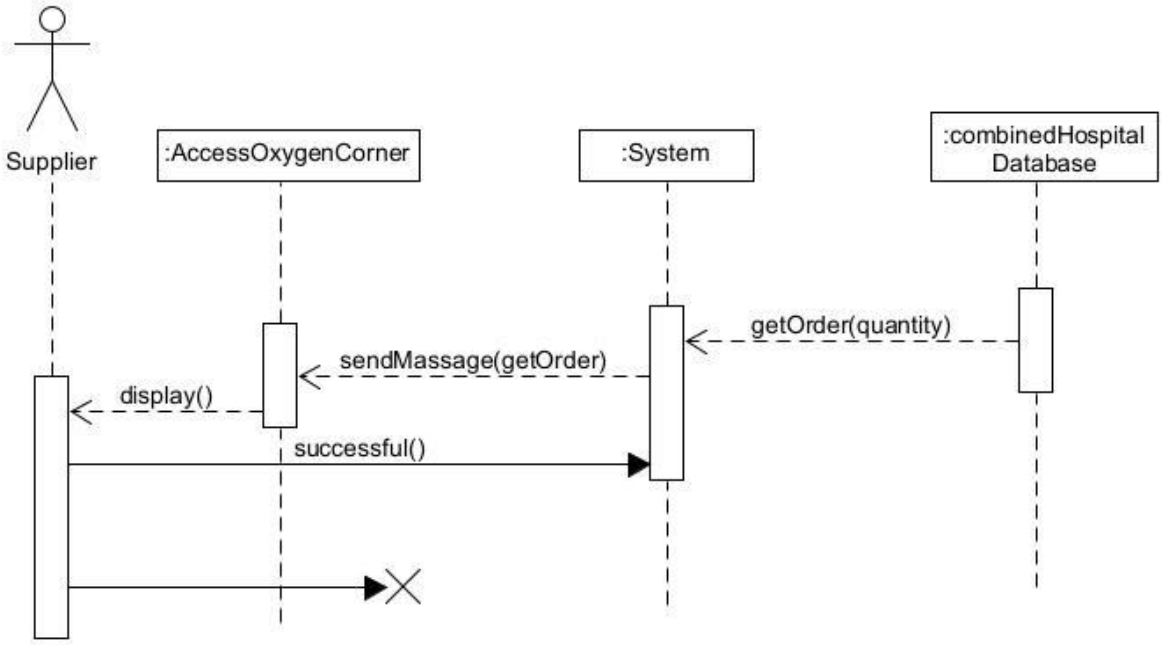


Figure 26: SD_EHS-010(3)

Description:

The system will ask for quantity after the admin selects the required stock. He(admin) can also enter the quantity he requires. After that, the system receives the order and sends a message to the supplier. And lastly, the supplier send the success massage.

Class Diagram

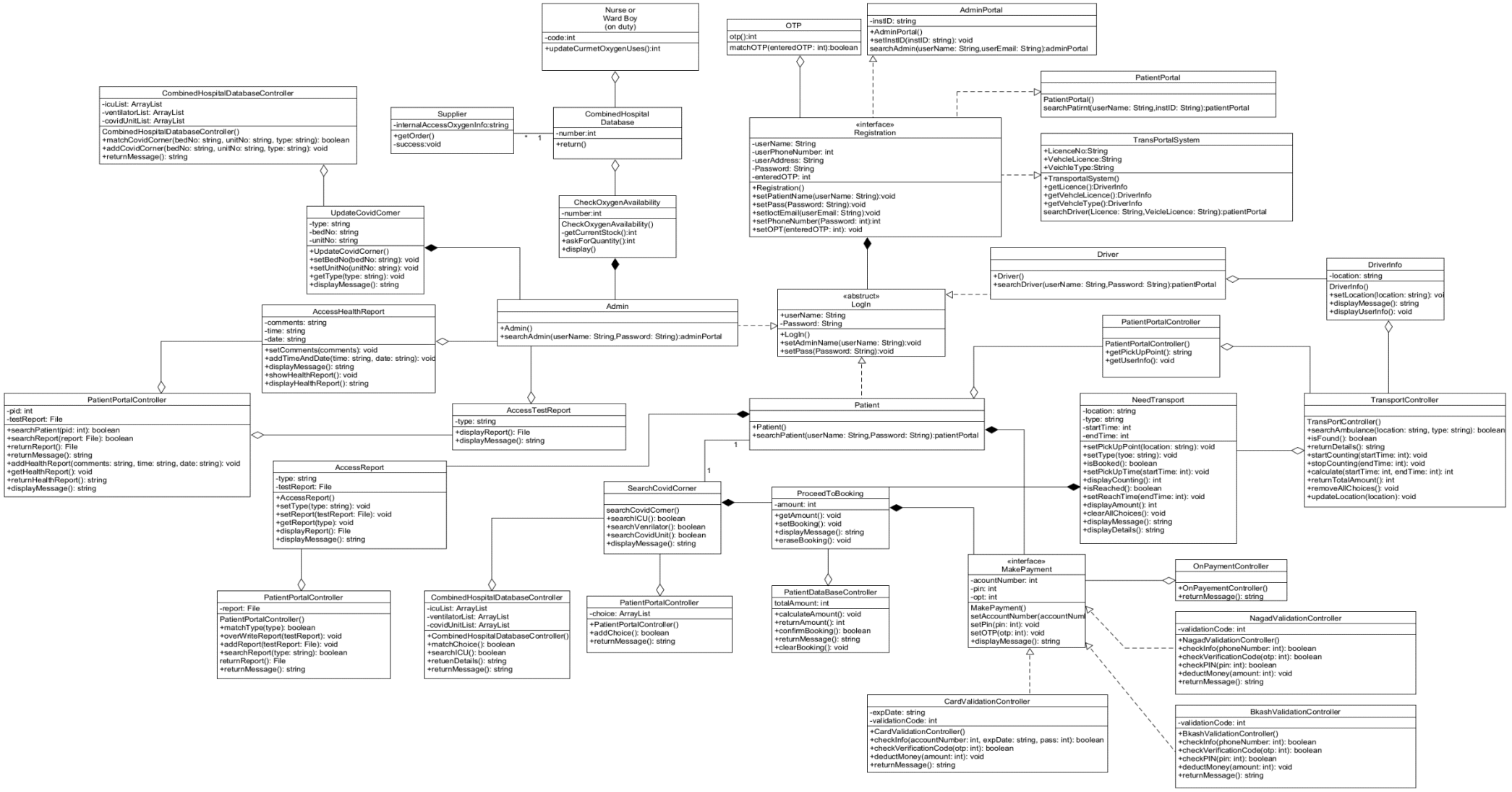


Figure 27: Class Diagram

Class Diagram's Description:

Our system is about Emergency Health Service. To use this app, you must first register. A user will establish his or her own portal after registering. OTP is used to verify user registration. After that, the user can log in to the system. A patient can look for things like covid corner, ICU, and CCU. The patient portal controller is constantly updating patient service information, and the unified hospital database is storing all of the necessary information as well as the transaction. The patient can also use a transportation service that allows them to see all of the driver's information and the transportation process in real time. All transport information and driver information are updated on a regular basis by the transport controller. The driver is a user as well. He or she must make a booking in order to receive any type of service. They (patients) can pay online via Bkash, Nagad, and card when the booking process is completed. They can also make a monetary payment.

All of a user's information is visible to the administrator. He (admin) can verify oxygen availability from the unified hospital database and pass the massage supplier if oxygen is required. By combining hospitals, the admin can edit the covid corner. database. He can also access the patient test and health report by patient database. Patient can check their reports from patient portal at any time.

Design Principles:

OCP

OCP stands for open for extension and close for modification. In our project's class diagram, we can see that, Make Payment is an interface and most of the common required things are inside this class. If a new payment method is introduced, we can extend it and with the Make Payment class. There may be a few variables and methods need to fill-up the requirements. In future, if we need to change something in the newly introduced method, our core function will not be changed. This is how we can implement OCP in our project.

Proposed Class Diagram:

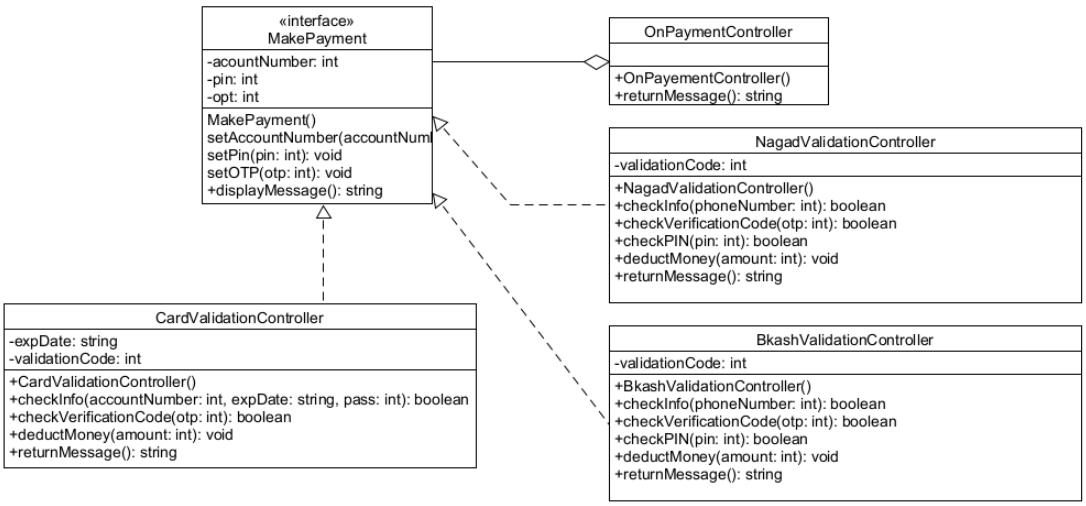


Figure 28: OCP_CD-EHS005

LSP

LSP stands for Liskov Substitution Principal. In our project's class diagram, we can see that, Registration is an interface which takes new user's data so that they can register themselves to use our system. But there is patient, admin and driver whose working principals are not same in this project. So, we cannot directly connect them with Registration. So, we have extended individually with additional variables and attributes is required to specify themselves.

Proposed Class Diagram:

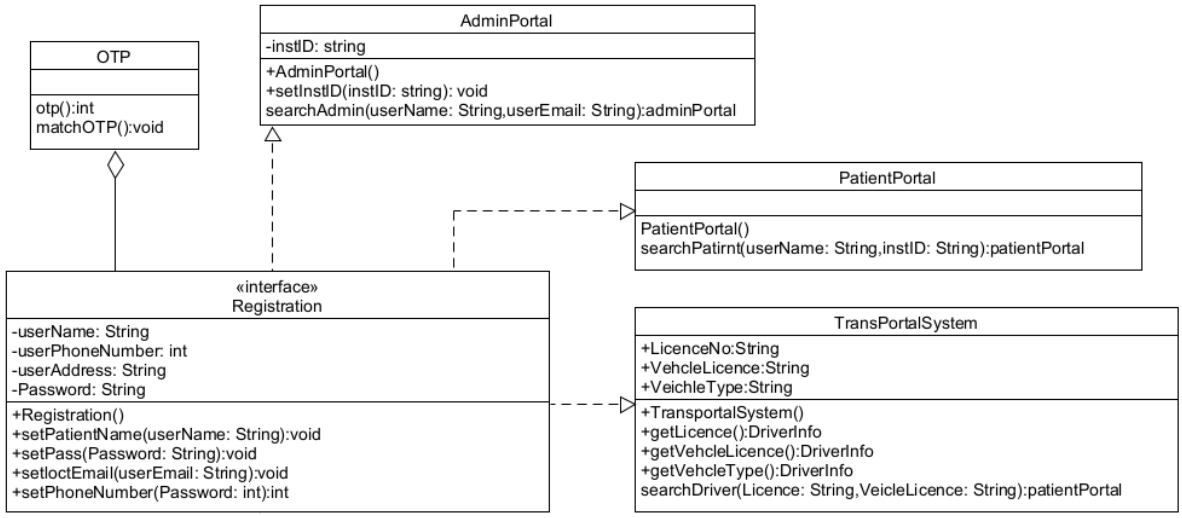


Figure 29: LSC_CD-EHS001

DIP:

DIP stands for Dependency Inversion Principle. Our transaction procedure is not fully depending on Make Payment class. When a transaction is going to happen, an there is different verification systems that may use to verify their accounts and abstraction and polymorphism concept is used.

SRP:

SRP stands for Single Responsibility Principles. In our project, we have separated our Covid Corner booking facility into three parts. First one can select ICU, ventilation or covid unit. Then he will be guided to Proceed to Booking. Here, if he select confirm booking, only then he can be guided to Make Payment. Else he can cancel the booking and all the choices will be cleared.

ISP:

ISP stands for Interface Segregation Principle. In our project's class diagram, we can see that, in Access Oxygen Corner, an admin can give order for oxygen stock if there is shortage. And a supplier can take the order, but he does not have any access to see the current Oxygen stock of the hospital.

Prototype Design
Registration:

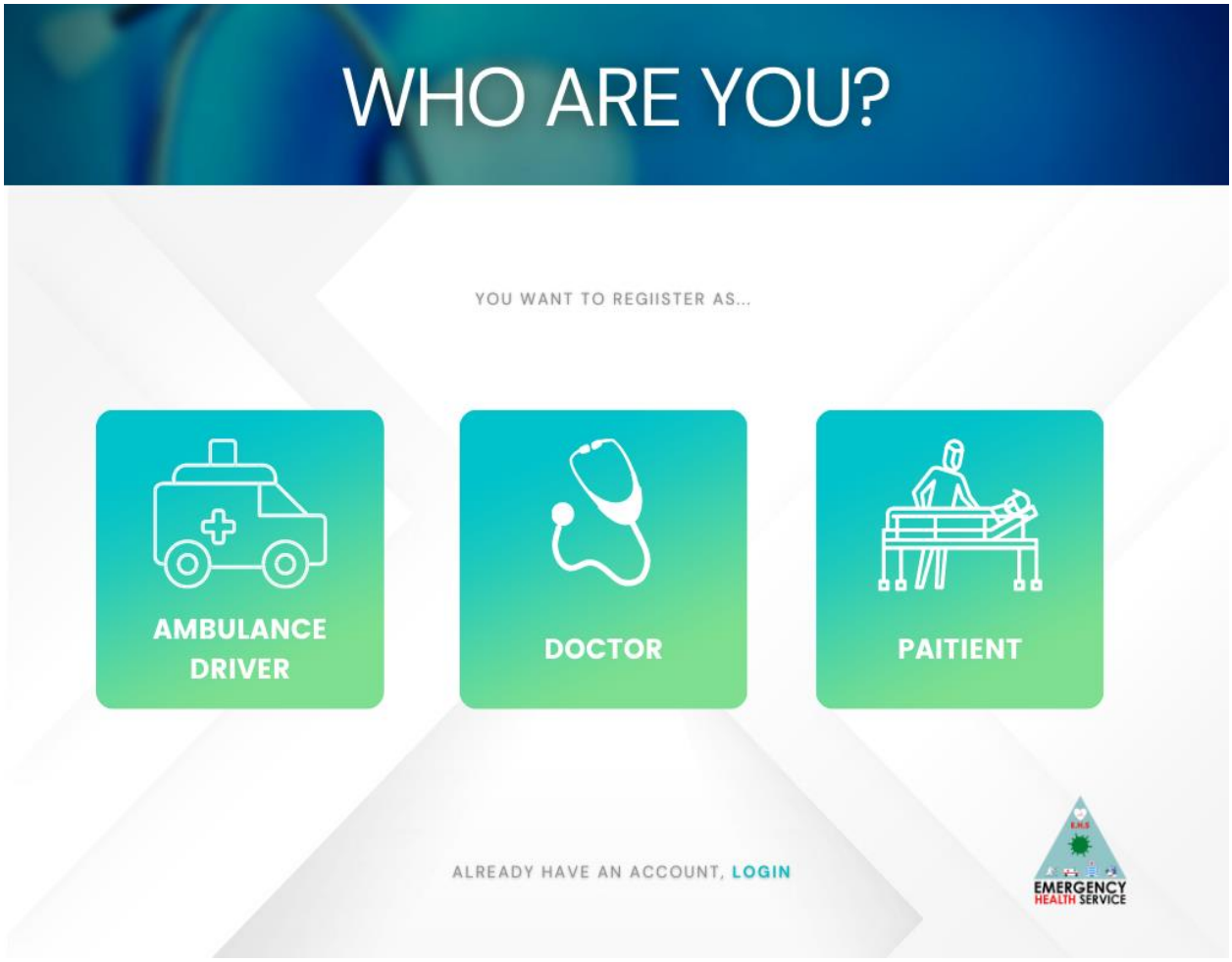


Figure 30: PT_EHS-001

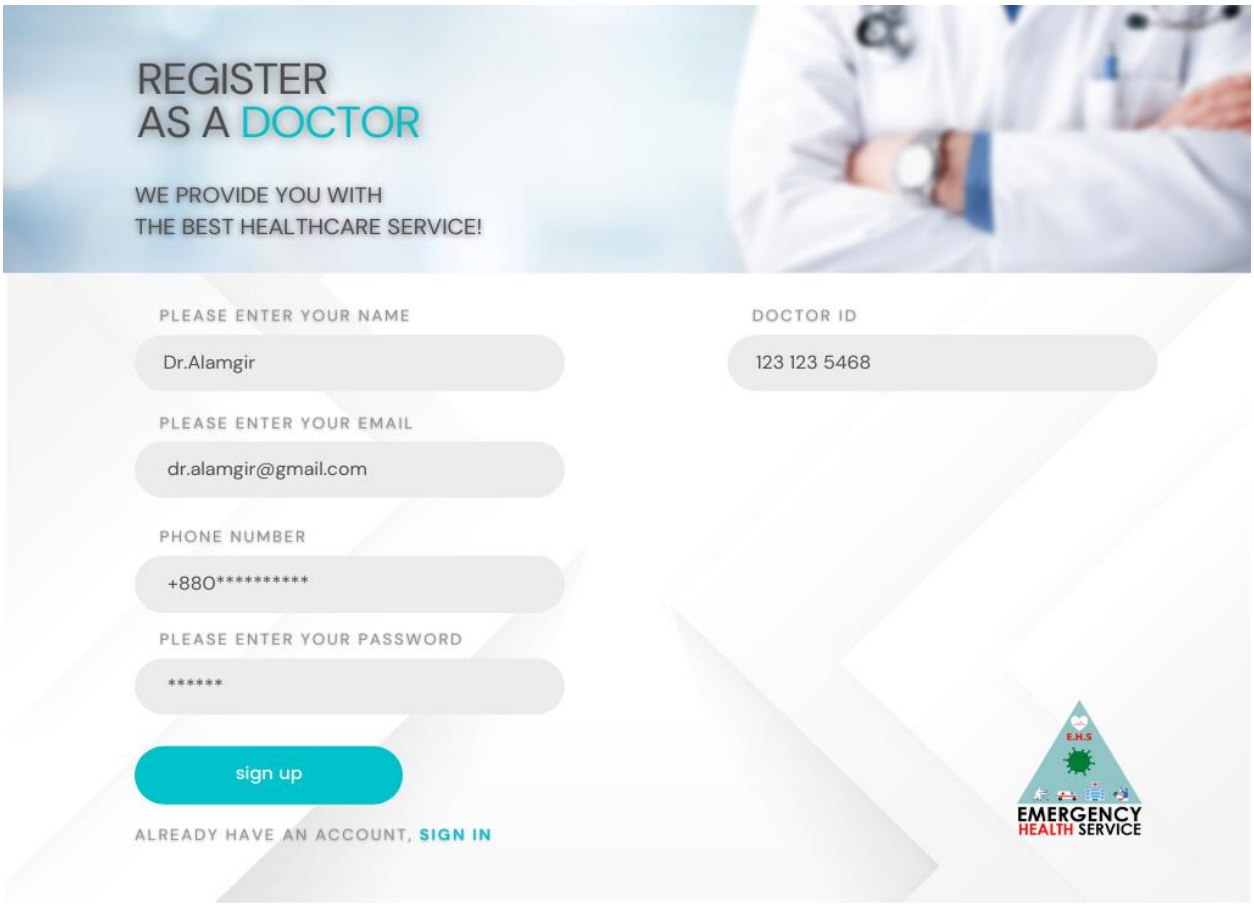


Figure 31: PT_EHS-001(1)

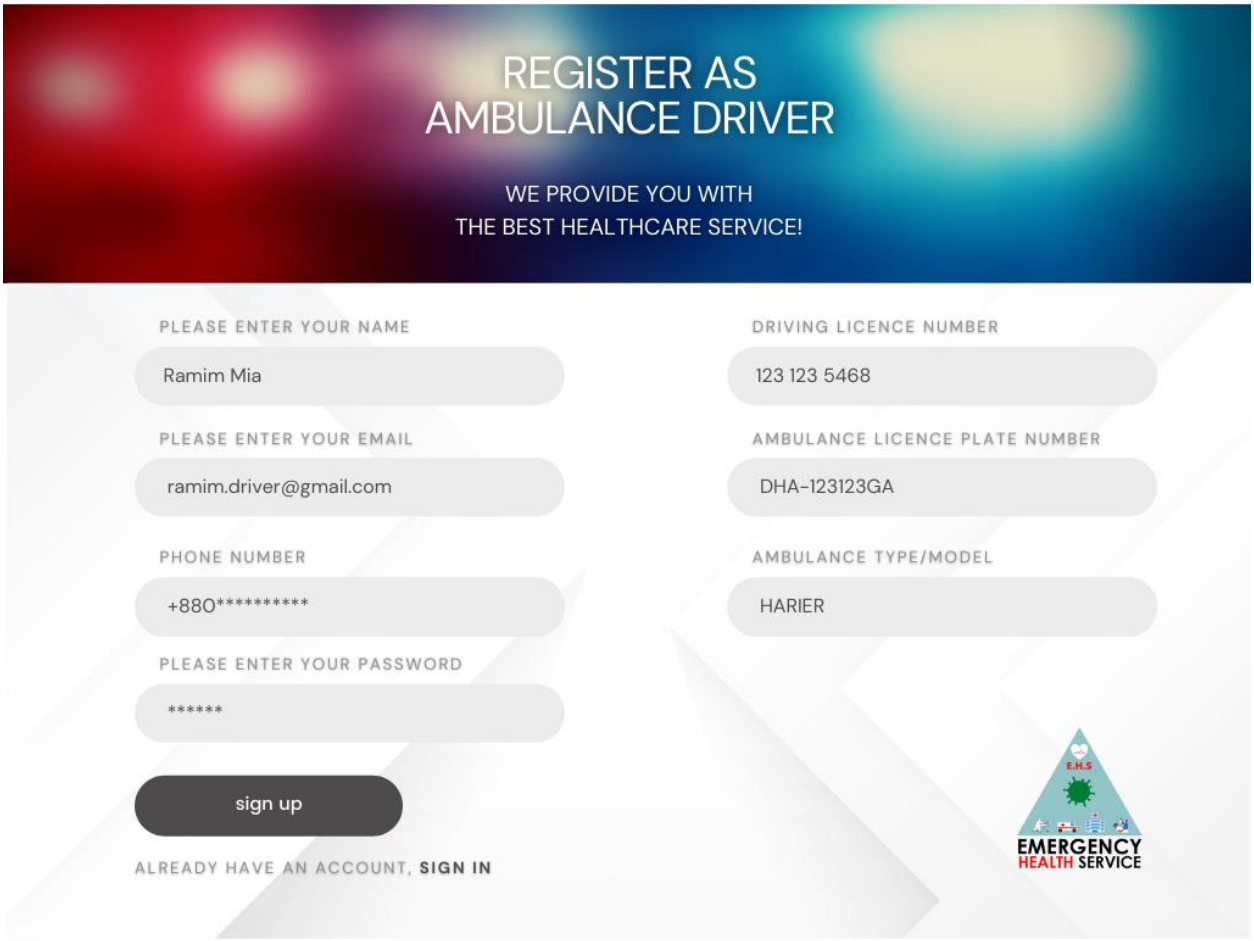


Figure 32: PT_EHS-001(2)

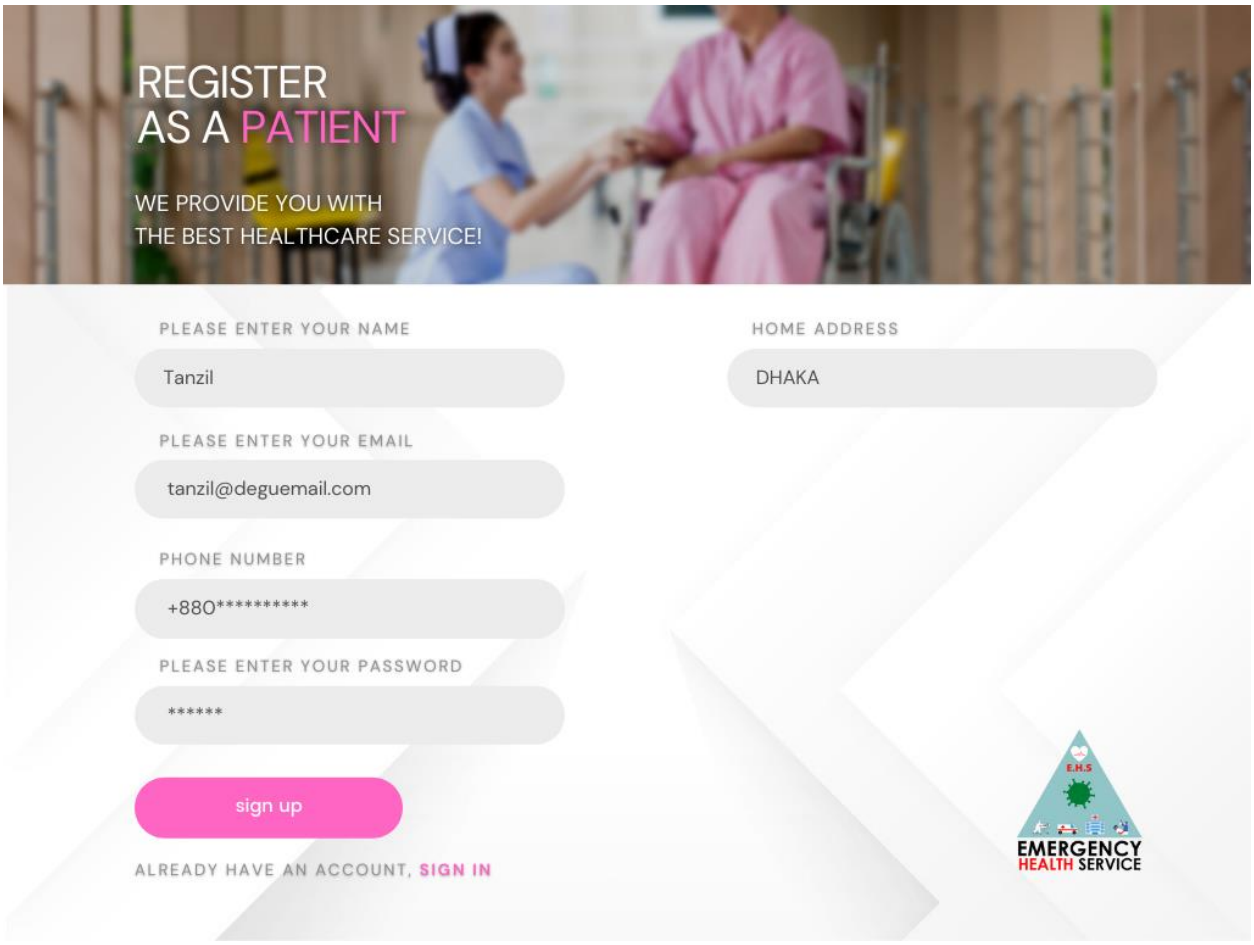


Figure 33: PT_EHS_001(3)

Login:

Figure 34: PT_EHS-002

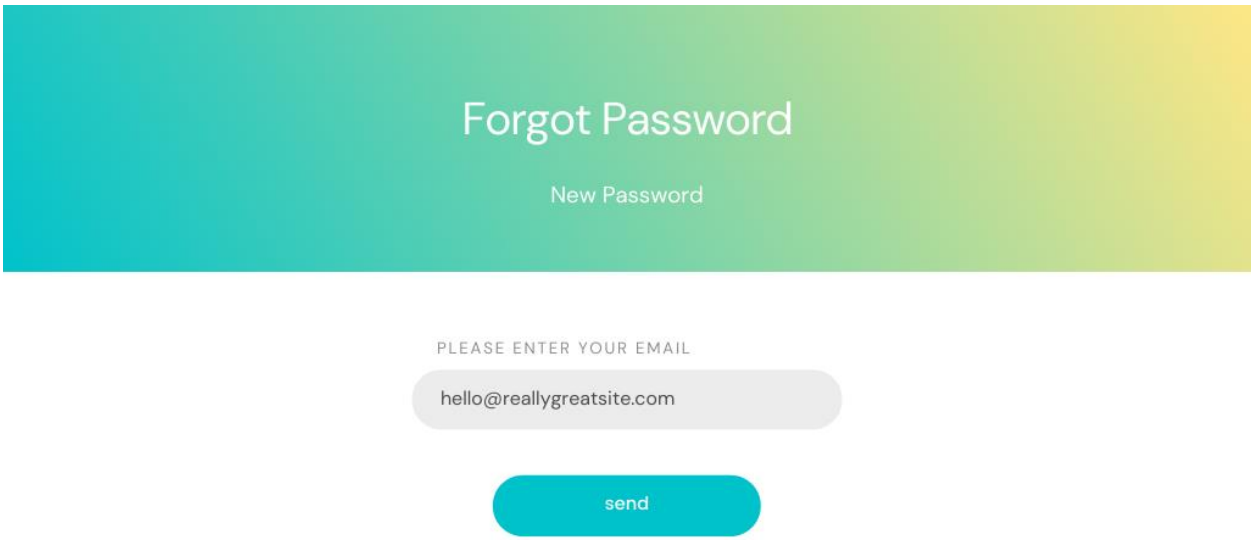


Figure 35: PT_EHS-002(1)

Search Covid Corner:

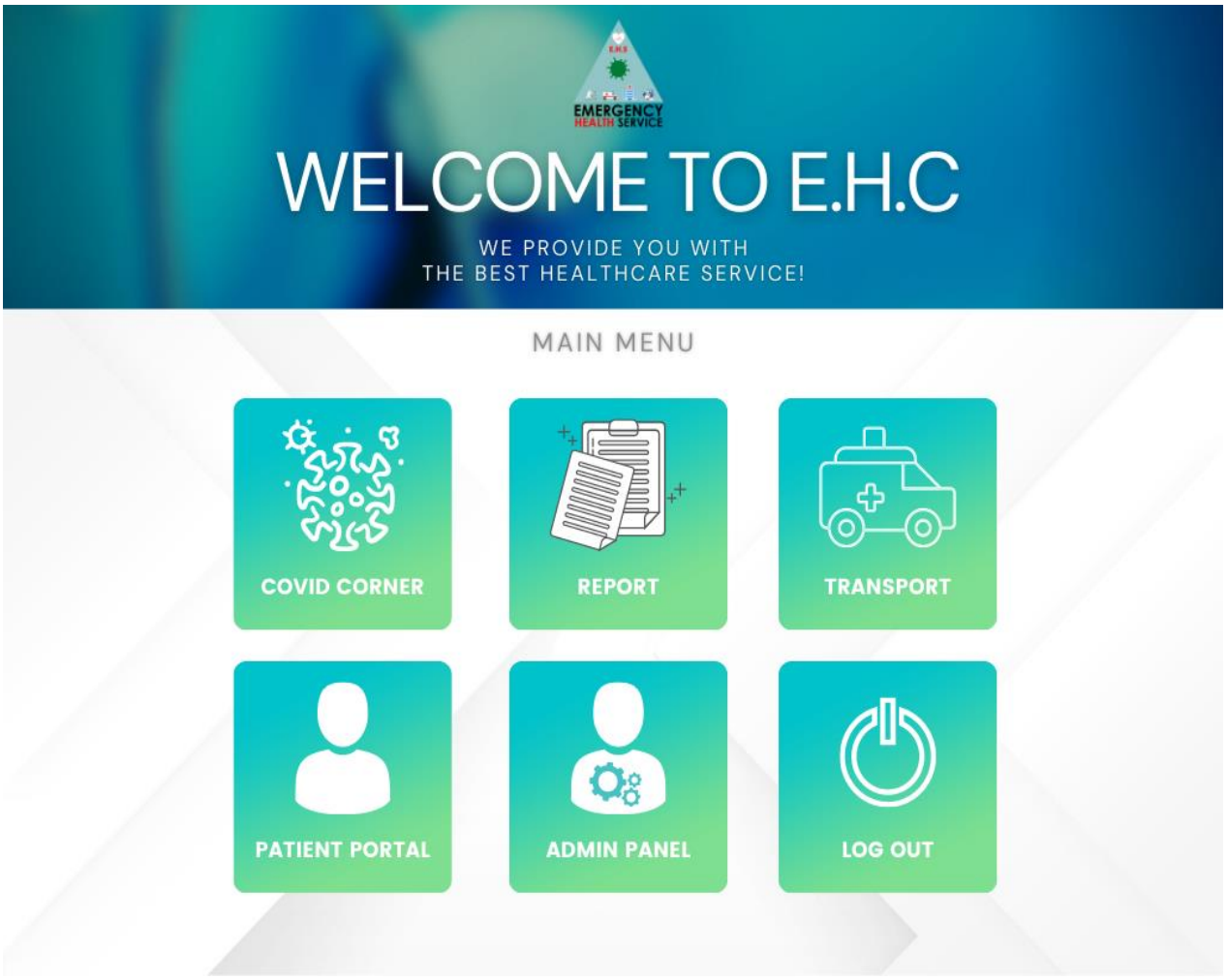


Figure 36: PT_EHS_Home_Page

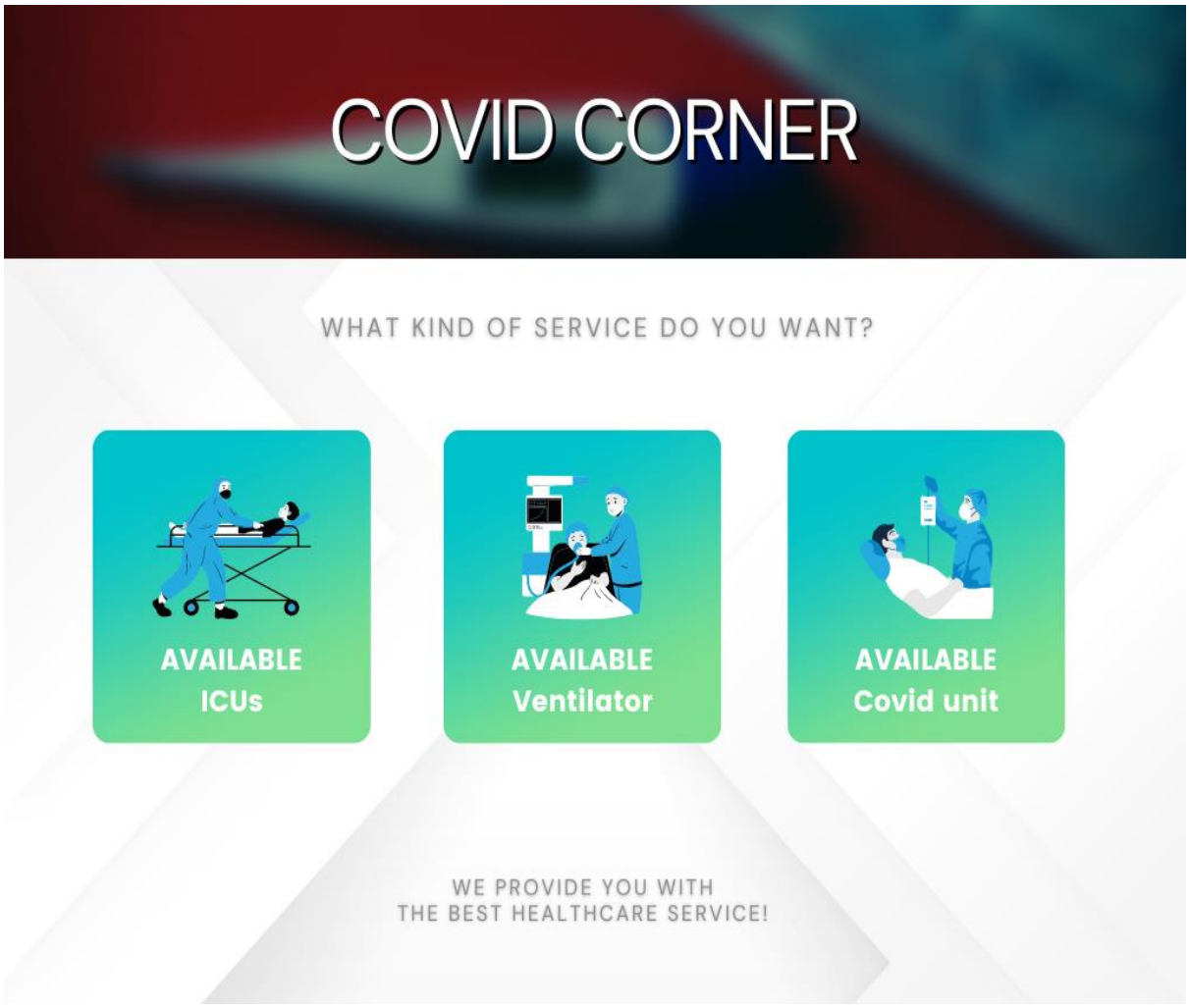


Figure 37: PT_EHS-003

Proceed to Booking:

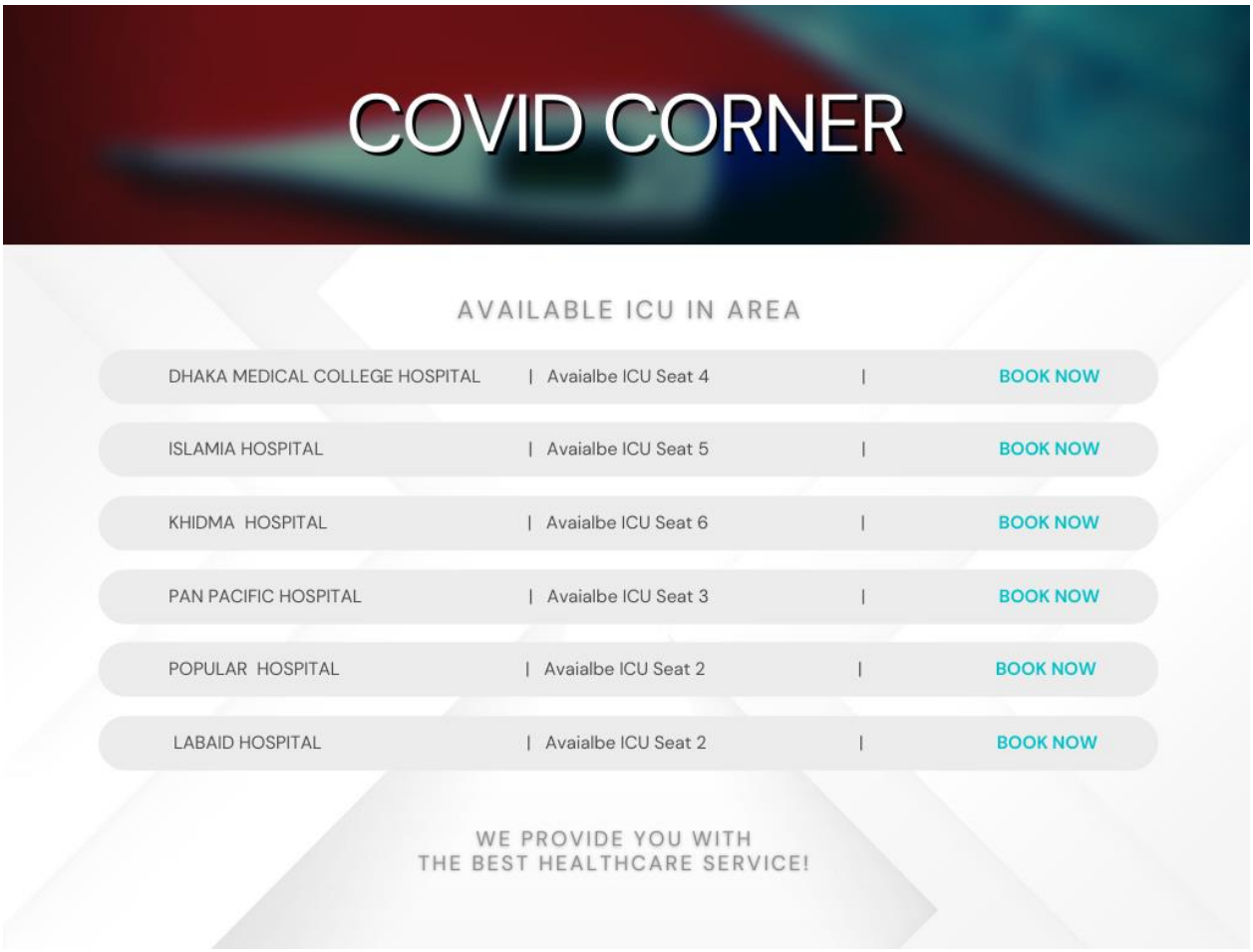


Figure 38: PT_EHS-004

Make payment:

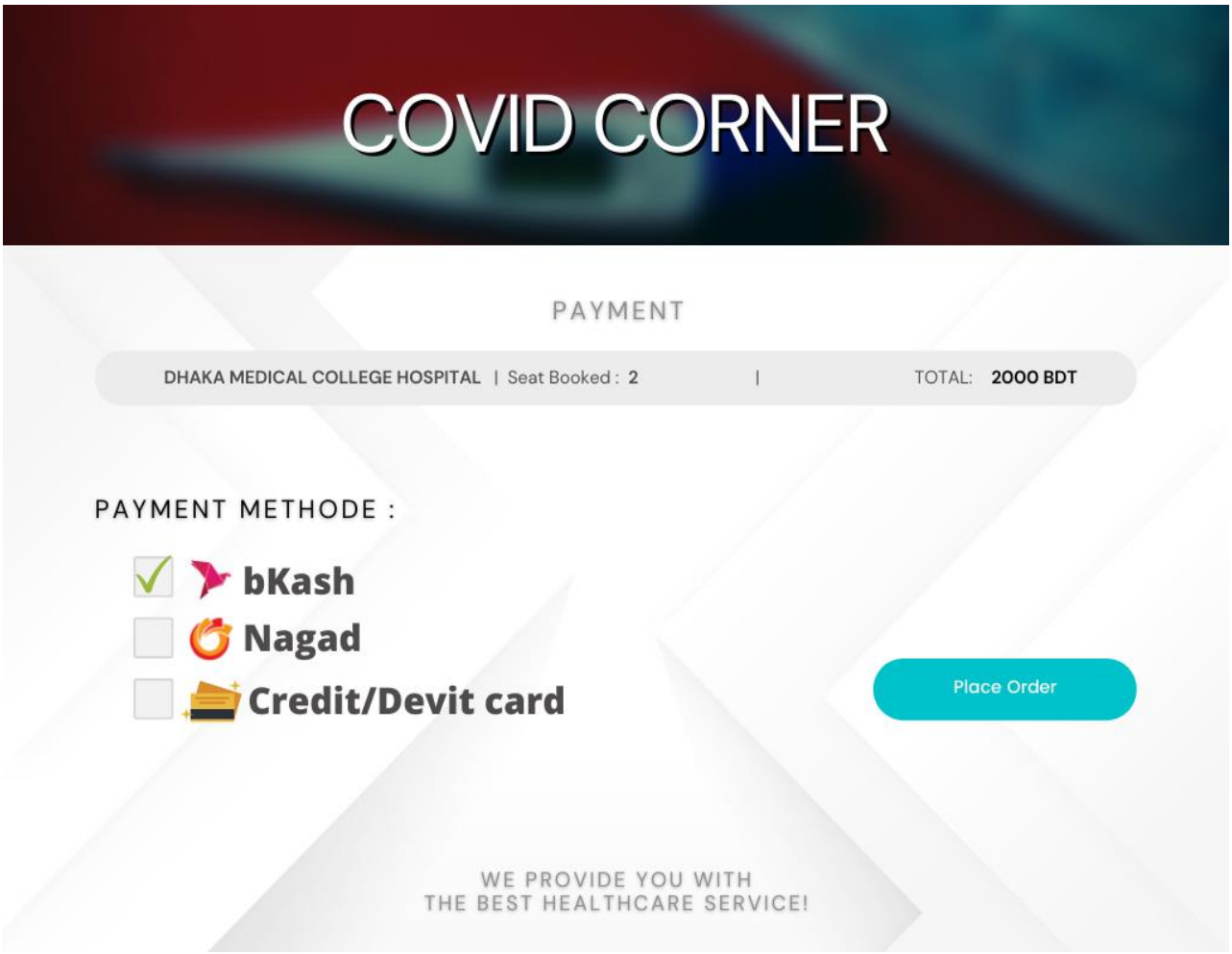


Figure 39: PT_EHS-005

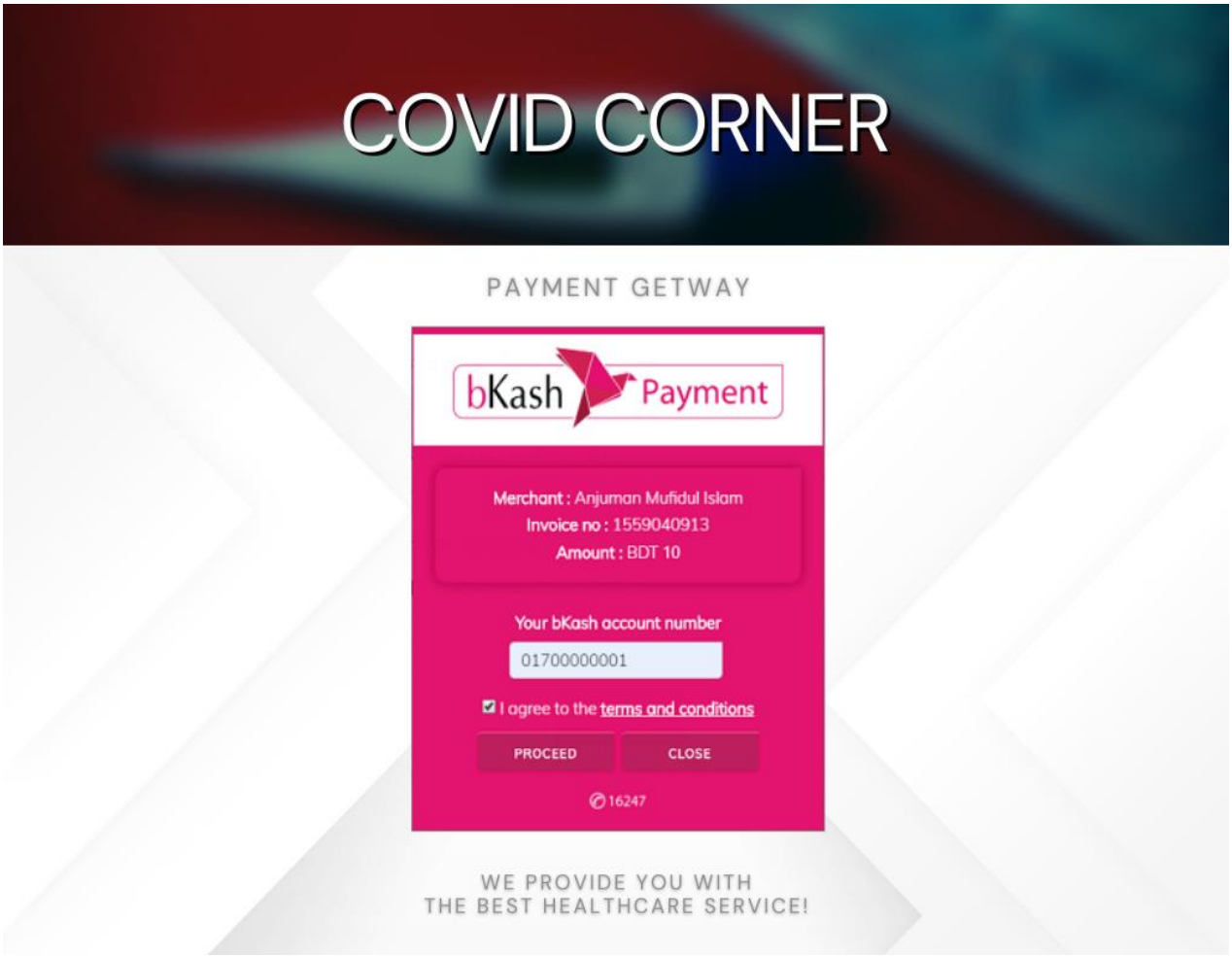


Figure 40: PT_EHS-005(1)

Access Report:

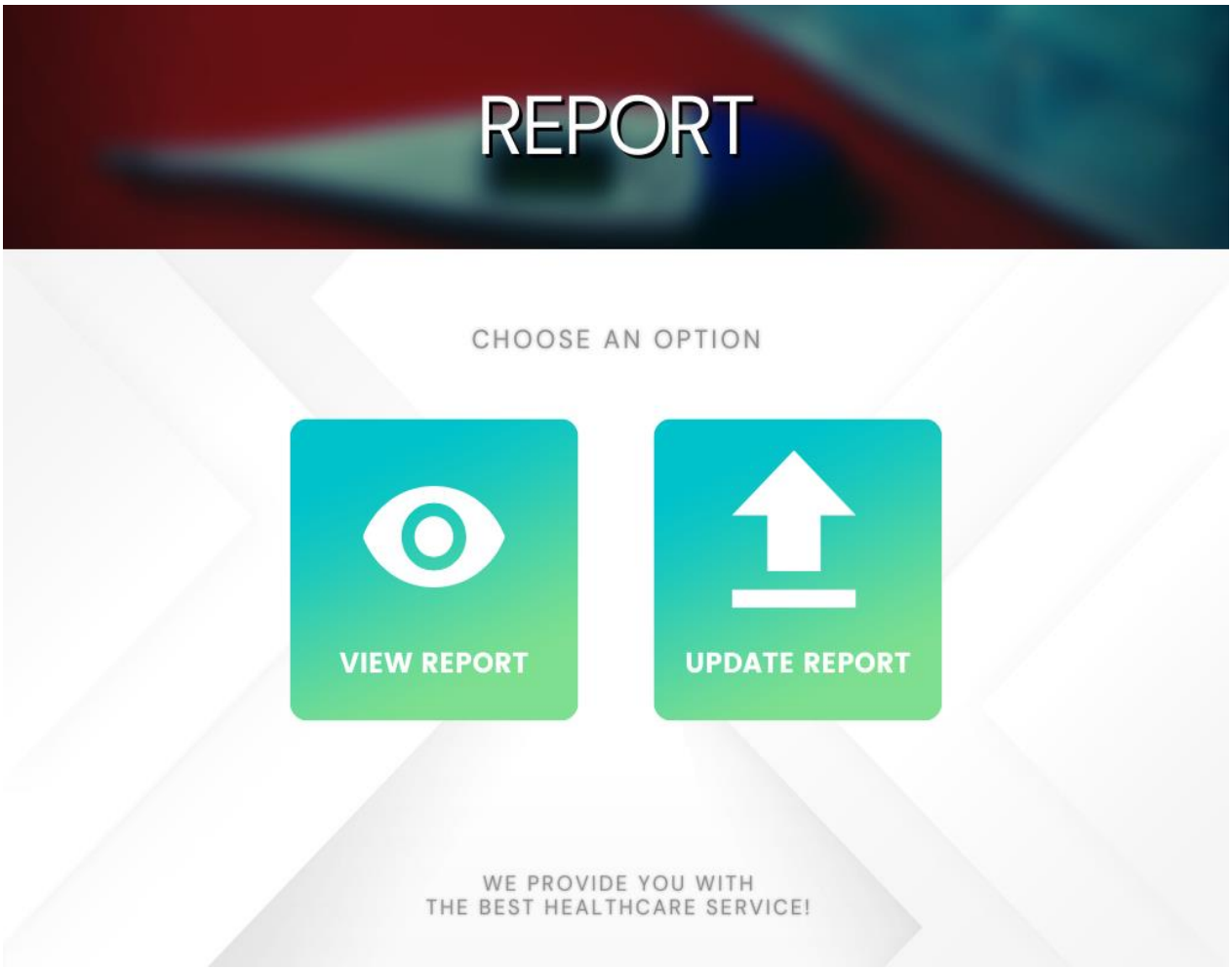


Figure 41: PT_EHS-006

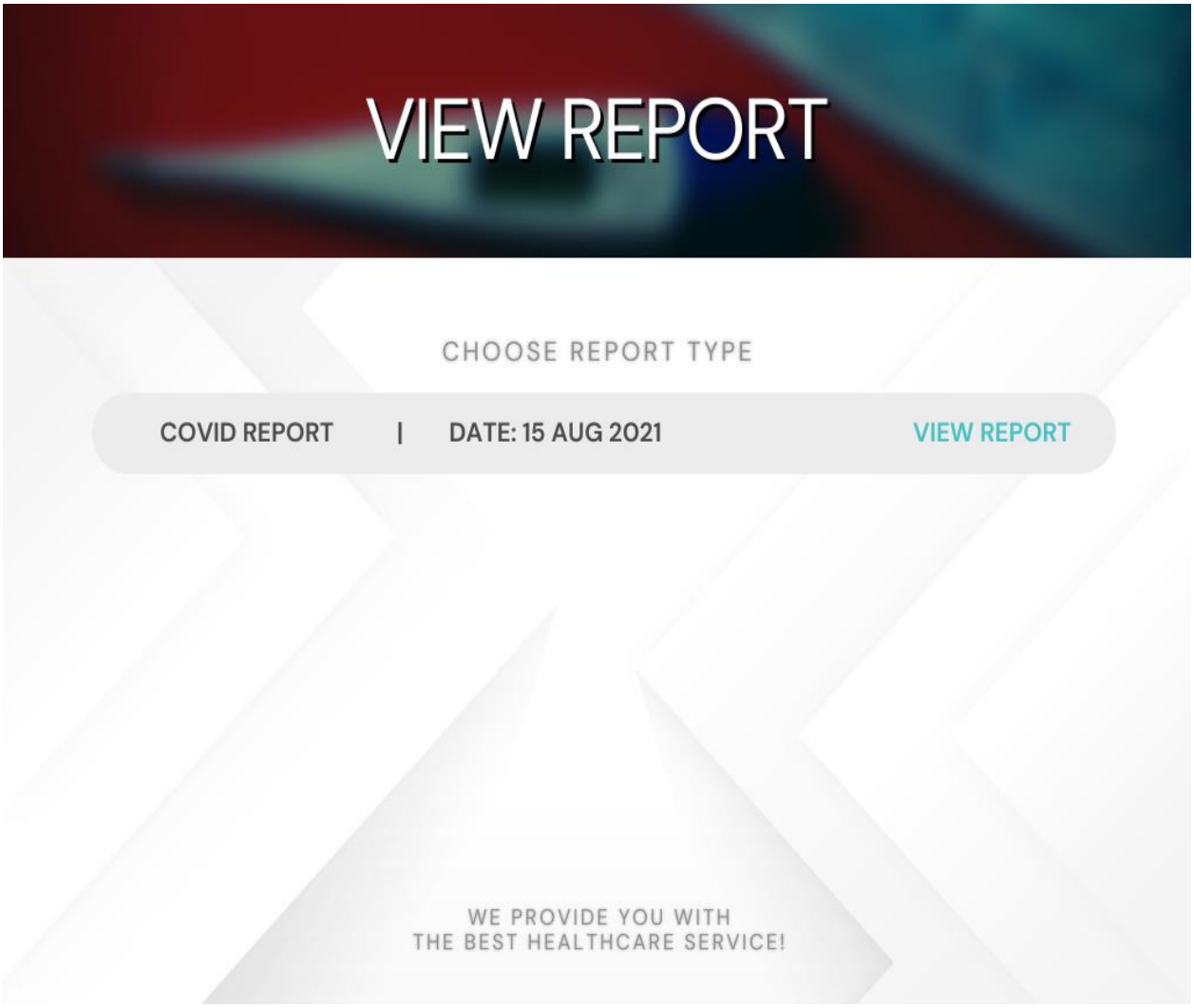


Figure 42: PT_EHS-006(1)

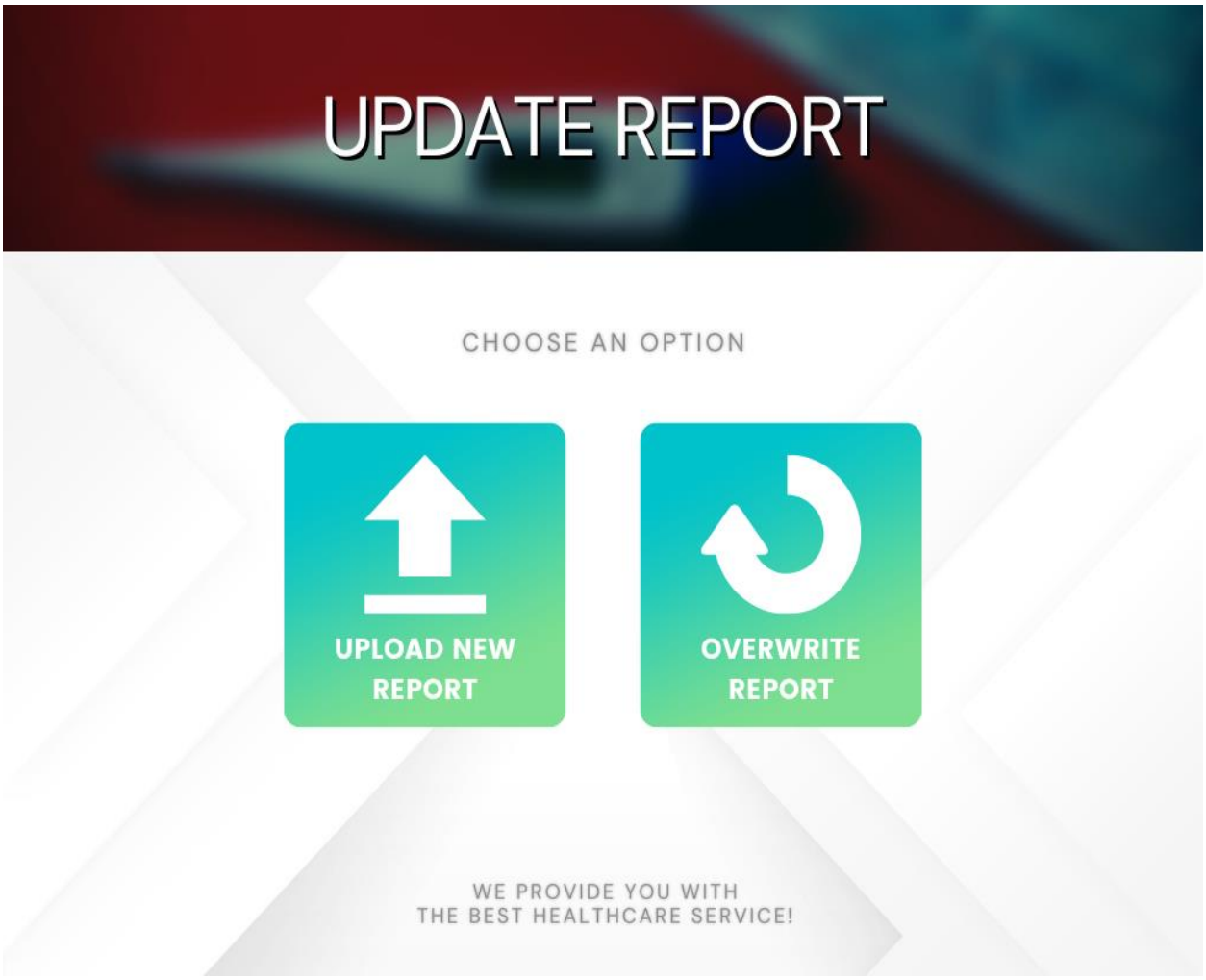


Figure 43: PT_EHS-006(2)

Need Transport:

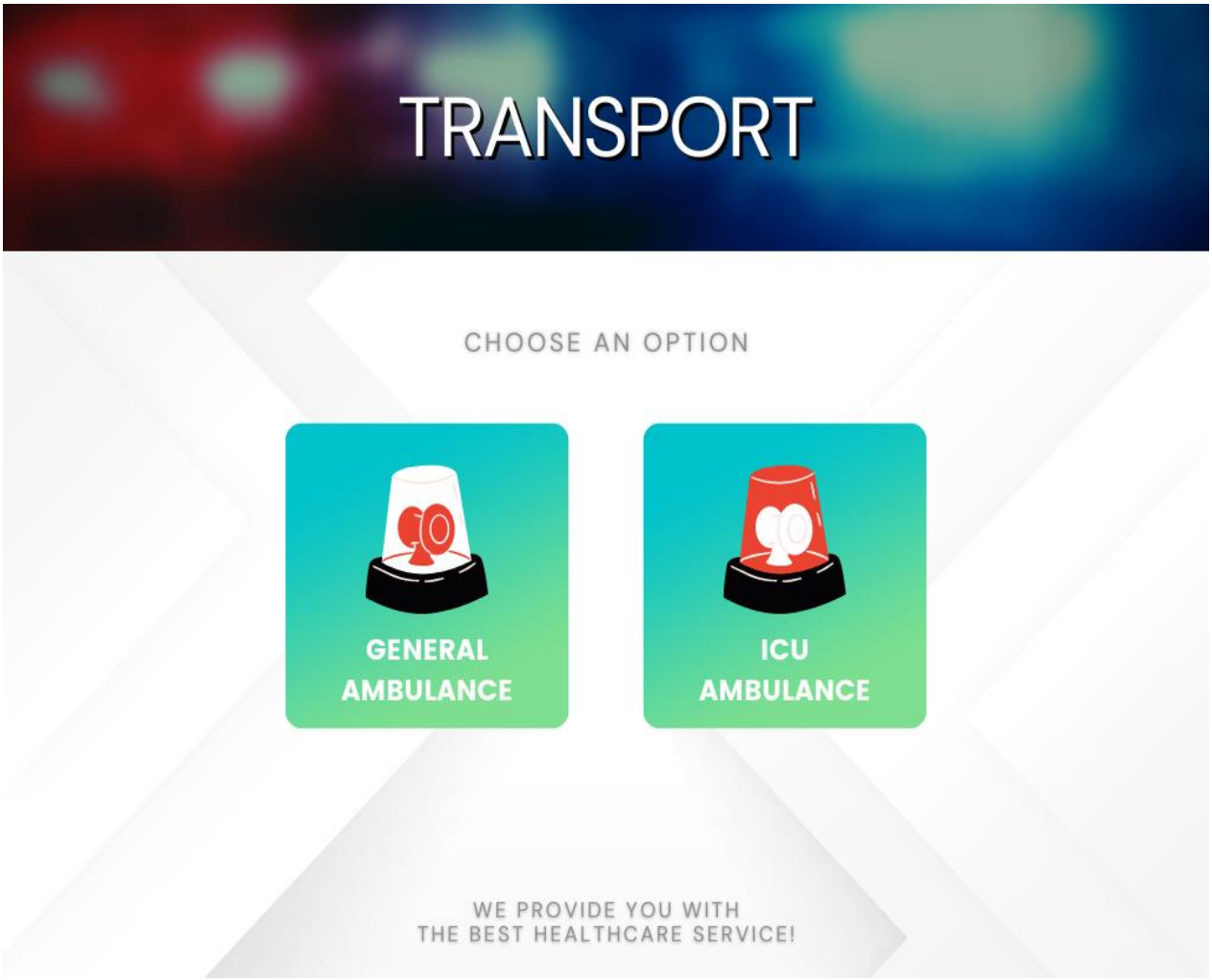


Figure 44: PT_EHS-007

Figure 45: PT_EHS-007(1)

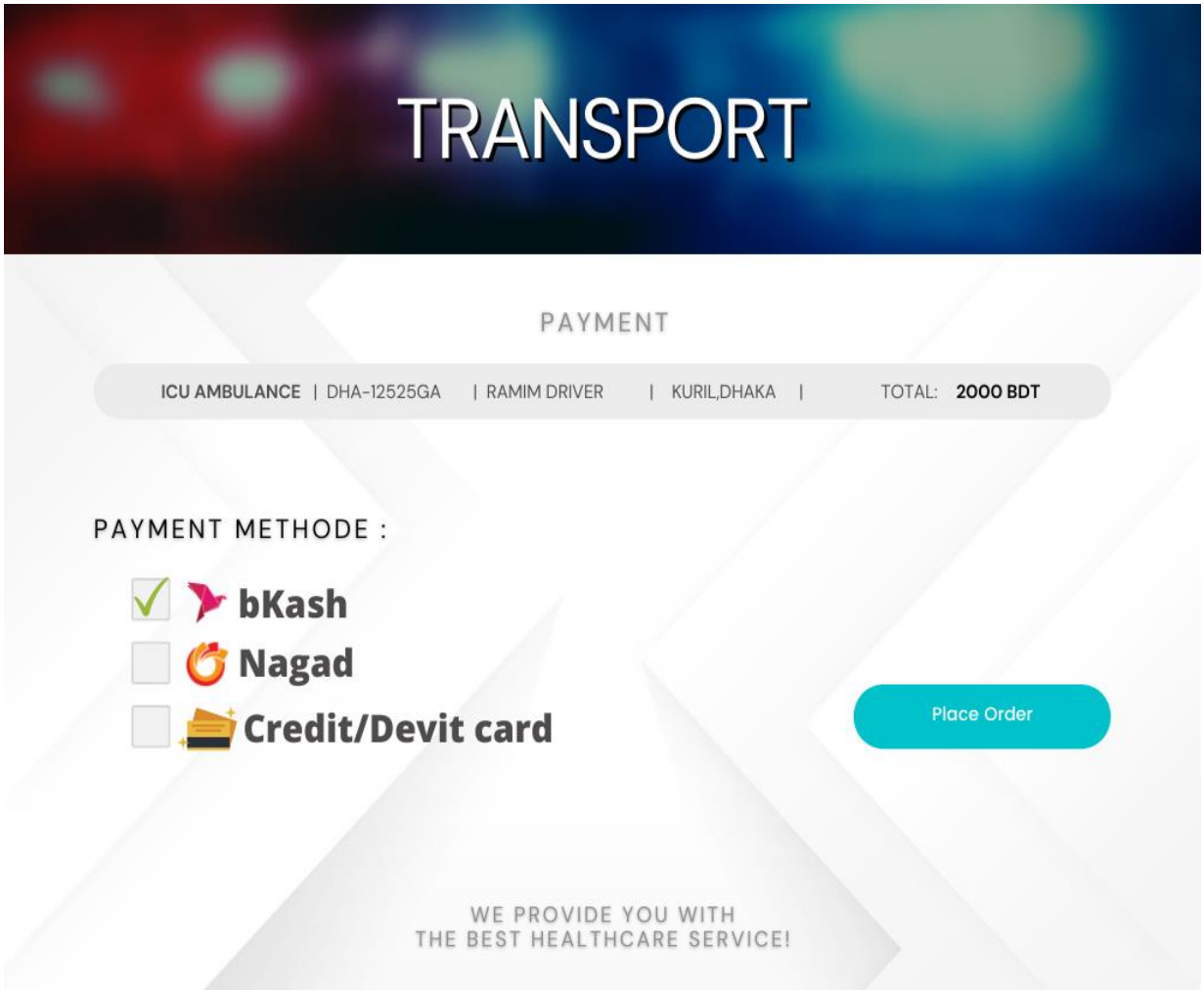


Figure 46: PT_EHS-007(2)

Access Patient Portal:

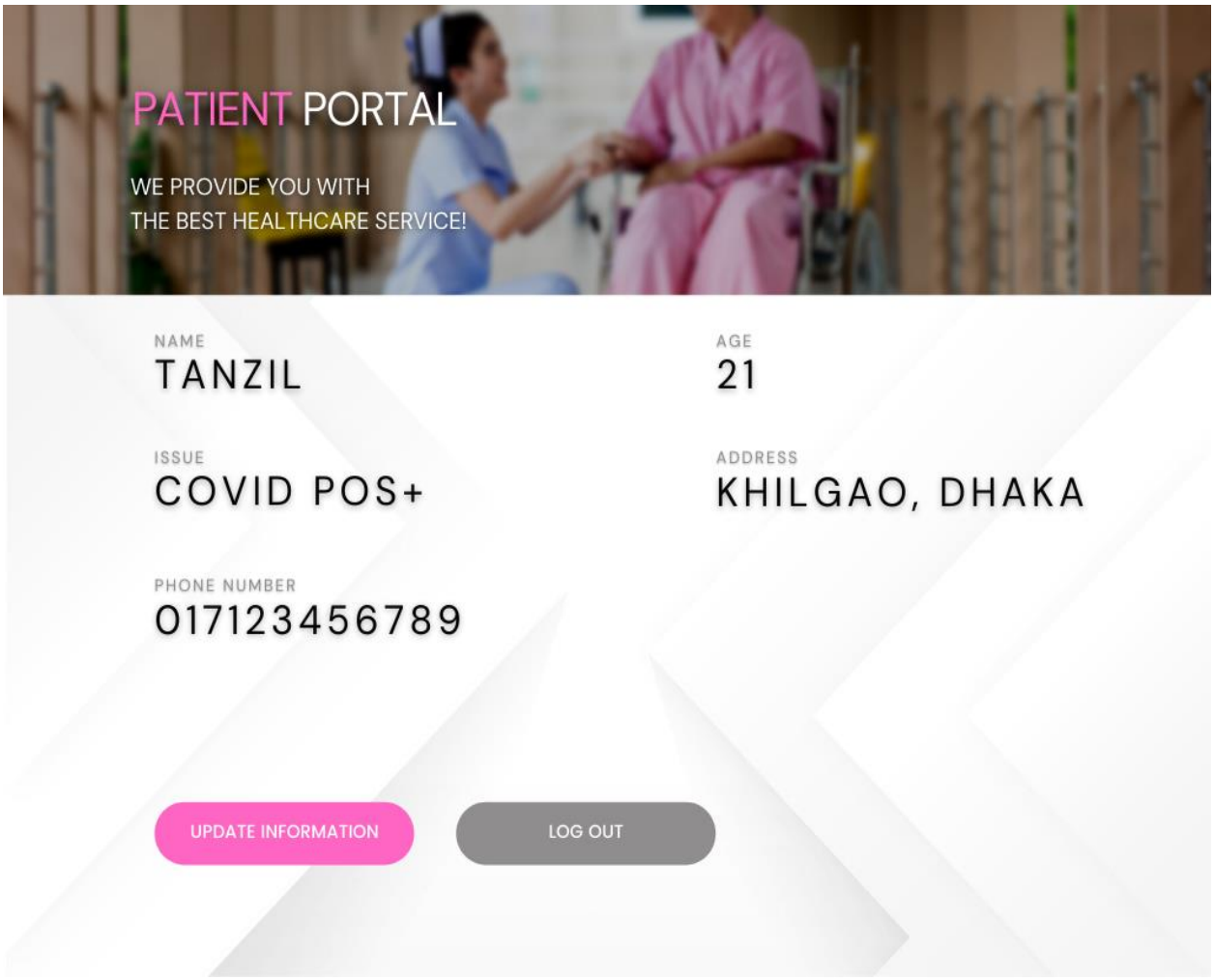


Figure 47: PT_EHS-009

Admin Portal

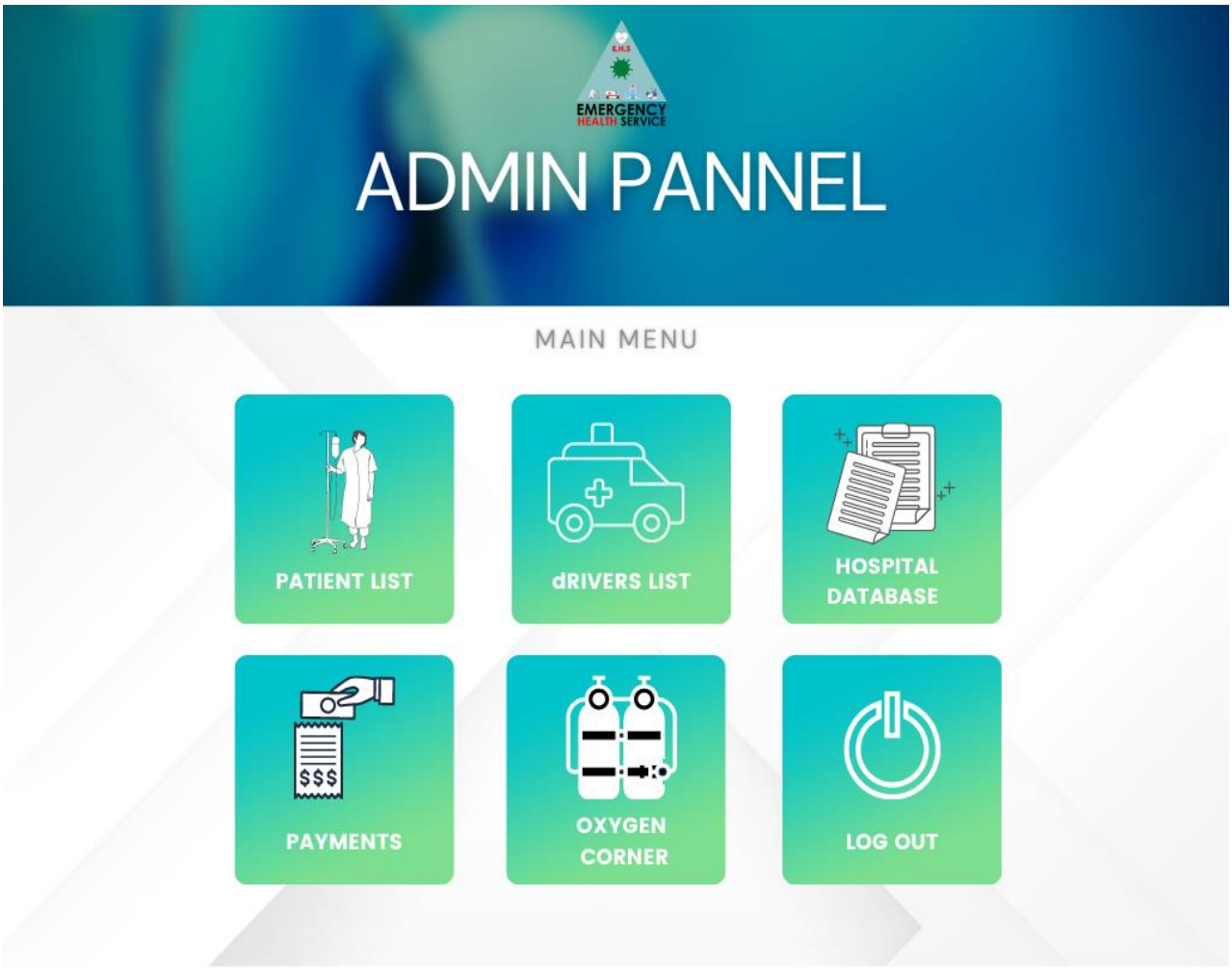


Figure 48: PT-EHS-010

Conclusion:

This project about system which name is “Emergency health care service”. Using this apps user can get emergency Covid health care service. For using this app at first user have to do register him in the system. After that user can take view number of covid corners vacancy inside or combined hospital database. In emergency period, it may help one to get the service with less time consumption.

Here, a doctor can have the chance to see his patient test report and previous health report with the help of virtualization. Thus, social distancing maintained.

An ambulance driver can register himself and give emergency services to the patient. He can also get his payment online with the integrated payment gateway system.

Also, we have designed an interface for the hospital authority to check total oxygen availability in the hospital. If there is shortage, they can order the required amount and the system will search registered supplier who can provide that service at the lowest amount.

In this report we design the system. At first, we design use case diagram where we see the relationship between actor with use case, actor to actor and case to case. Based on use case diagram we make use case specification that helps us to know relation between actor and system. Using use case specification, we made activity diagram for each one. Then we made sequence diagram where we see interaction among object. From sequence diagram we made our class diagram. Each a class have method, attributes. after class diagram we made design principal. They'll assist us in developing a clean, modular design that will be simple to test, debug, and manage in the future. At last, we create a prototype design for this system. It is a visual representation of this system.

This study exhibits our strategy for resolving the current challenges in emergency health care and assisting the healthcare industry in generating income totally based on online. This system is designed primarily for use in an epidemic condition. As a result, it aids people in times of crisis.

References

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